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BULLETIN OF
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ANNUAL GRADUATE FORTNIGHT
Disorders of the Circulation
October 19 to 30, 1931

PSYCHONEUROSES AND NEUROSES AND THE HEART*

ROBERT H. HALSEY
New York

Introduction.

In these days of investigative psychology and applied psychiatry a program to be complete must consider the relation of the psychoneuroses. This is particularly true with the subject allotted since the control of the cardiovascular system lies wholly within the domain of the involuntary nervous system.

Every physician, practicing in whatever branch or specialty of medicine, meets at some time the patient who is more or less the victim of an unstable involuntary nervous system and the patient requires proper diagnosis and advice. It is the responsible task of the physician, therefore, to determine the part that the nervous system contributes to the unhappiness of the moment and give adequate and appropriate relief and comfort.

The text books have gradually eliminated discussion of the phenomena which were formerly known as neuroses. There are two reasons why this has happened; first, be-

*Delivered October 29, 1931.

cause most of those disturbances had a characteristic pathology; and second, because the term "cardiac neurosis" was so vague and ambiguous that a definite mechanism of the nervous system was not recognized. But while the authors are quite correct in omitting the topics that were improperly included under this caption it is as great an error to ignore the fact that there is a group of disturbances of the circulation and heart definitely due to disorders of the involuntary nervous system. The omission from the text books of the name, definition and description of neurosis unfortunately does not inhibit nor prevent the incidence of the disorder.

That emotions were affecting the heart was recognized definitely in 1836 by Dr. John Calthrop Williams[6] of London, who said,

"Allowing, however, that diseases of the heart have increased of late years, we have a clear and important explanation of the fact.

"With the advance of civilization, the physical and moral system of man becomes more sensitive, and then the passions necessarily acquire a greater influence over the animal organization; the more, also, the passions are curbed, after being once strongly excited and exercised, the more baneful is their influence on the nervous system, until they are completely subdued.

"When we reflect, therefore, on the powerful influence that mental emotions exercise over the action of the heart; on the changes affected, in this respect, by anger, hatred, and revenge—by love, joy, or sorrow—by avarice and ambition; when we credit our former assertion, that functional derangement will terminate in organic disease, and that this functional derangement is daily and hourly produced by the activity of these feelings; then we are bound to believe that disorders of the circulation and the heart have increased of late years, and will still increase in proportion as the nervous system is affected by the more frequent and ardent operation of the passions . . ."

There are at least twenty-seven[7] different varieties of personality depending upon the interplay of heredity, environment and adaptation. These influences render the individual the victim to a greater or less degree of the instinctive reactions.

McDougall[8] has defined them as follows: (1) The instinctive reactions become capable of being initiated, not only by the perception of objects of the kind which directly excite the innate disposition, the natural or native excitants of the instinct, but also by ideas of such objects, and by perceptions and by ideas of objects of other kinds: (2) The bodily movements in which the instincts find expression may be modified and complicated to an indefinitely great degree: (3) Owing to the complexity of the ideas which can bring human instincts into play, it frequently happens that several instincts are simultaneously excited; when the several processes blend with various degrees of intimacy: (4) The instinctive tendencies become more or less systematically organized about certain objects or ideas.

He defines and lists the instincts and emotions as follows: The principal instincts of man "In the case of the principal powerful instincts the affective quality of each instinctive process and the sum of visceral and bodily changes in which it expresses itself are peculiar and distinct; hence language provides special names for such modes of affective experience, names such as anger, fear, curiosity; and the generic name for them is 'emotion'.

The Instinct	The Emotion	
Flight	Fear	
Repulsion	Disgust	
Curiosity	Wonder	
Pugnacity	Anger	
Self-abasement (Subjection)	Subjection (Negative)	Self-feeling
Self-assertion (Self-display)	Elation (Positive)	Self-feeling
Parental	Tender	

Seven emotions plus pleasure and pain compounded others.

The Instinct	The Emotion
Reproduction	Lust
Hunger	Impulse to seize
	Feeding
Gregarious	Social
Collect and hoard	Ownership
Acquisitive	
Construct	Creativeness
Laughter	Amusement

The emotions, then, act by unknown processes to cause activity of the involuntary nervous system and thus become manifest in symptoms at one of the three levels as L. Brown[3] has so well described: first, the psychical with obsessions; second, the sensory-motor, with paralysis, contracture, tic and anæsthesia; and third, the visceral with various vegetative neuroses.

But in whatever way the sympathetic system is brought into action it simulates the ordinary expression of certain emotions—preeminently the emotion of fear—tachycardia, palpitation, sweating, blanching extremities and gastro-intestinal disturbances.

Dr. Cannon[4] has shown that many changes of internal chemistry accompany the external evidences of emotional conflicts.

That a psychoneurosis may be based upon repressed or subconscious fear is clearly recognized and whenever the personal resistance is lowered by disease, emotional shock or psychic conflict our equanimity is impaired.

"In view of the demonstrated reactions of the mind to conditions of environment, used in its broadest sense, it appears justified to connect them with the heart disorders which occur so frequently with the emotions as the etiological factor. From work done by psychologists and psychiatrists it seems justified to point out that it is an unhappy status of mind due to unfulfilled desires and conflicts that

sets the stage, or conditions the onset of a cardiac disturbance, as one way of escape from unhappy situations, or as an offensive in the accomplishment of a much desired objective."

It is the circumstances of the environment, of the hereditary stuff, of the geographical position, of the educational attainments and even of disease that often determine the failure or fulfillment of legitimate human desires. Desires which may not have been formulated even in the conscious thought or words but the failure of achievement may be attended by conflicting emotions as poignant and keen as if the wish had been expressed.

The accomplishment of some desire may require building an offensive over a long period of time and then the neurosis becomes a substitute, an explanation and an asset (Casamajor).

Definition

A cardiac neurosis[6] is a visceral or organ neurosis and may be defined as a disorder of the physiologic action of the heart produced by an emotional reaction of the patient.

Experimental work has been done which suggests that certain substances acting upon the heart can produce a critical state of the heart muscle under which condition it will react to stimuli in a very different way than when the critical state does not exist. This conception recognizes the principle that one physiological derangement must exist before another stimulus will be effective to produce the abnormal reaction. Thus the patient with a neurosis of the heart must have had some psychical disturbance or conflict of sufficiently long duration to set the stage, or conditions, for an apparently unrelated event of emotional character to start an abnormal mechanism in the heart.

The emotional reactions affect disturbances of cardiac physiology by unknown processes but translate the effect of the stimulus by arousing activity in the involuntary nervous system which manifests the action in visible and

otherwise measurable changes. When the autonomic system is thus aroused the personality reacts with various psychoneurotic symptoms which may be but frequently are not related in the patient's consciousness directly to the original cause of the whole process—the conflict.

The repetition, or the continuation over a considerable period of time, of the pathogenic emotional reactions may produce changes which are of the nature of altered pattern reactions of the involuntary nervous system and with or without actual structural change.

The conception of chemistry which describes reactions as reversible and irreversible will, perhaps, also explain the conditions of the changes in the nervous system—that is, as long as the process remains reversible there is no structural change but when changes of structure occur the process becomes irreversible. Or, to restate the concept, as the lipases, or fat splitting enzymes, produce dextrorotary or levorotary acids depending upon inert substances added to the mixture. These chemical processes describe reactions to which the emotional reactions in psychoneuroses may be analogous.

The new mechanism may be initiated in a heart previously undamaged or it may complicate the action of a heart already structurally damaged by disease. Of itself it adds no disease process, it produces no structural change of visible pathology, it produces only a physiological derangement of action.

Etiology

To uncover the emotional pathogenesis requires tact and patience as well as skillful inquiry into the details of the physical and social conditions preceding the onset. It may be essential to understand the emotional history of the family as well as of the individual. The ambitions and desires of social attainments and financial independence. The previous and present marital and sex relations must be known to reveal the needs of an offensive or defensive attitude from the point of view of the patient. Prolonged

illness or sudden injury may be the precipitating cause. Ignorance of what constitutes disease of the heart and fear of sudden death seem to cause a much more profound psychoneurotic disturbance than fear of disease of any other organ. The intimate daily contact with one near and dear throughout the prolonged distress and suffering of heart failure with congestion terminating in death may set the stage for later psychoneurotic events. Parental reminders and inhibitions of children and professional inept suggestions or assertions during a physical examination whether routine in character or as preliminary to life insurance may initiate the emotional background of a psychoneurosis.

Toxic substances of tea, coffee, tobacco and alcohol in regular or irregular doses may act to render the heart more sensitive to the emotional struggle. Mechanical conditions such as distended stomach, or colon, and the accidental escape of air or gas into the abdominal cavity through the uterine tube during a test for patency may precipitate an unusual mechanism. It may not be easy to recognize the emotional factor in these mechanical discomforts but ignorance, surprise and fear may be the correlated emotional stimuli of the sympathetic system.

The symptom complex of neuro-circulatory asthenia (effort syndrome or irritable heart) appears to be due to an hereditary instability, or pathologic constitutional entity (Warthin). They are eliminated by our definition, which is—a disorder of the physiologic action of the heart produced by an emotional reaction of the patient.

Types of phenomena which are produced by the emotional conflicts will be manifest by changes of rhythm, rate and sensations; thus, there may be simple acceleration, premature contractions, either basal or apical in origin, paroxysmal tachycardia—of the various types, such as simple auricular flutter, fibrillation, or ventricular; and sensations of consciousness of the heart action or pain in the precordial region.

Symptoms.

Hans Driesch[5] has shown the relation between certain conscious phenomena and the vital processes. He believes that instinctive reactions are complex motions which do not rest upon an "historical basis" acquired by the individual. They are perfect from the beginning; they cannot be improved at least with regard to their specificity though they may be, perhaps with regard to the velocity with which they are performed. Pawlow[9] has shown that hunger and the smell of food may have a sequence in the secretion of saliva and he has demonstrated that the sound of a bell may cause the flow of gastric juice and other conditioned reactions. It is common knowledge that emotions and suggestion, or auto-suggestion, can and do accelerate the heart rate or the gastro-intestinal tract.

The subjective sensations are described by the patient in terms of the individual's intelligence and culture—a knowledge of these feelings[1] is essential to the physician for a due appreciation of their place and importance in the clinical syndrome and the inquirer should phrase the interrogation so thoughtfully and in such simple language as not to suggest the character of the answer. Beware of the question with an entangling implication.

The patient will describe the symptoms in terms of fullness, bursting, pressure, or soreness. The character of the heart action may be said to be fluttering, pounding, vigorous, weak, throbbing. Often the complaint will be of hearing a pulsation in the ears and giving greatest annoyance when lying down to sleep. Occasionally breathing irregularities may be noted but actual dyspnœa does not belong to the neurosis but to some complicating structural damage. Dizziness, giddiness, faintness, choking or sensations of gripping of the throat, and swallowing and belching of air may be described. Sweating may be profuse and a tremor of marked degree may be present. Fatigue may be the chief complaint after relatively slight exertion. Occasionally pain referred to the precordium usually toward

the nipple or ventricular apex area may be the chief symptom and, more rarely, only careful analysis and repeated observations will differentiate it from coronary disease. In the analysis as Bramwell[2] has said, due consideration must be given to "the situation and character of the pain, to the constancy, intensity and circumstances which appear to influence it: the cause to which the patient attributes his pain and possible misconceptions on his part which call for correction; the personality of the individual, his surroundings, his suggestibility and his general outlook on his case; his responsibilities and his sense of responsibility; the existence of an inferiority complex, his financial position, and, it may be, the question of compensation and his attitude towards it." A variable and mobile systolic blood pressure may be found.

Differentiation from diseases, as myocardial degeneration, anæmia and toxic thyroid conditions is usually easy but may be difficult.

Physical Evidence.

Absence of the usual results, symptoms and signs of structural damage or failing heart. Presence of one of the various types of arrhythmia, usually of paroxysmal onset. Often accompanied by a diffuse, vigorous action of the heart.

During the physical examination it is important not to introduce new suspicions or suggestions of disease and at the same time to be so systematically thorough as not only to have the complete picture but also to inspire confidence that all has been done that should be done. This will add weight to the opinion expressed.

Diagnosis.

To the diagnosis of a cardiac neurosis the differential must be made between three conditions; first, is there structural damage and what is its etiology: second, is there a psychoneurosis arising from fear of heart disease

or fear of the results of heart disease: third, is there a visceral or cardiac neurosis—which is an organ neurosis and may be defined as a disorder of the physiologic action of the heart produced by an emotional reaction of the patient.

The student of medicine does not appreciate disorders not structurally demonstrable; for, often he is introduced to the consideration of diseases of the heart by observing hospital patients with advanced organic damage or patients in the late stages of cardiac failure. Such patients often are admitted and readmitted with congestive failure once or twice and then come to necropsy. The gross and microscopic pathologic findings often so impress the observer as to suggest two thoughts: first that structural changes are essential to even physiologic disturbances; that murmurs accompany all heart disease and indicate the onset of congestive failure and a rapid course to the necropsy table. This early experience with terminal congestive failure often makes it extremely difficult for the physician, even the more experienced practicing physician, to recognize later the part the emotions play in cardiac physiology.

The post war advances in knowledge of and popular interest in psychology have directed attention to the importance of psychic states in the life of the individual. Since a cardiac neurosis is a disorder of the regulatory mechanism of the heart the failure will be of this and not of the mechanical or structural system. If the disorder occurs after a structural damage there will be the combination of the two but in any event there will be an illogical or bizarre group of symptoms when compared with reactions incidental to failure of the myocardium.

In distinguishing the symptoms due to the structural change from those of emotional origin the skill and experience of the physician will be fully tested. The patient may be the spoiled and petted child; or the pampered and fearful young adult; or the frightened one of older age with

all the fears of "high blood pressure" or "hardening of the arteries."

If there is a well established organic damage the occurrence of sudden emotional excitement may precipitate the onset of congestive failure or of sudden death.

In arriving at a diagnosis it is necessary, first—to analyze the separate symptoms, then make a physical examination to discover the structural state and finally make an experimental test of the individual functions to discover deviations from normal; second—it is necessary to synthesize the findings into a syndrome fitting the pathologic physiology and indicating the pathogenesis.

Prognosis.

In its broadest aspect, the prognosis is the answer the patient desires and about which he questions himself and may not question the physician, for the questions are not always consciously or verbally expressed.

If suspected of having heart disease he may question himself somewhat in the following manner—Have I, or have I not "heart disease," "angina pectoris," "arteriosclerosis," "high pressure," "hardening of the arteries?"

If he has some cardiac defect his introspection may follow this line of thought—Am I going to die, or am I going to get well or be "cured?" Shall I be ill a short or a long time? Shall I suffer pain or die suddenly? Shall I be permanently crippled? Will my earning capacity be affected? Shall I change or lose my job? Must I assume financial debt? Can I afford to be ill?

The replies to the patient should state the facts in such a way as to answer these questions and at the same time inspire courage, hope and assurance.

Treatment.

A rational psychotherapy is essential and must be built up by fostering favorable sentiments and emotions and

avoiding unfavorable emotional reactions. Do not vacillate. Give assurance of the absence of danger. Make favorable and avoid unfavorable suggestions. Be sympathetic in manner for it is often more important how a statement is made than what is said and how an act is performed than what is done. The intimation that the symptoms are "imagined" or that there is "nothing the matter" will most certainly arouse the emotions and resentment as well as depreciate the weight of any subsequent diagnosis and advice offered.

A regime of prescribed rest and wholesome meals. If there is no damage of the whole by disease rest will not be necessary. If there has been a prolonged period of rest on account of a suspected disease it may be necessary to graduate the increasing activity. The guiding thought should be that a neurosis in itself does not restrict the possible activity of the heart. But if there is actual disease it must receive consideration. Hydrotherapy may be employed to stimulate circulatory reactions. As much active out-door exercise as may be permitted for two objectives—to improve the tone of muscles of skeleton and heart and to convince the patient of the efficiency of his heart. Out-door recreational games played with others is an effective way to remove the gloom and cheer the ego.

For a brief period in the beginning mild sedatives, as bromides or phenobarbital may be of the greatest aid. Preparations of opium or digitalis should not be given except when needed to control an abnormal mechanism.

Tea, coffee, tobacco, alcohol and sexual excitement should be avoided since they act to render more sensitive the sympathetic nervous system.

As to surgery—Gordon has stated concisely: "No removal of tissue or organs, no artificial correction of disturbances, however accurately or skillfully they may be done, will succeed in making a psycho-neurotic discard his fixed ideas, his hypochondriasis, his abulias, his fears or

his obsessions." But skillful, technical analysis may indicate the rational therapy which will assist effective illumination to do its work.

Gain intelligent cooperation through frankness, understanding and confidence, keeping in mind that a cardiac neurosis is a disorder of the physiologic action of the heart produced by an emotional reaction of the patient.

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PATHOLOGY OF CANCER OF THE LARGE INTESTINE*

(ABSTRACT)

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An analysis of 104 cases of carcinoma of the large intestine is compared with results of other investigators who have compiled results of a greater number of cases. In the 10 year period during which the 104 cases were observed there were no instances of sarcoma or melanoblastoma. During the same period there were 2 cases of carcinoma of the ileum and 1 of the duodenum. Lubarsch reported on 1608 cases of carcinoma of the intestine, of which 1510 were in the large intestine (664 in colon; 846 in rectum), 69 in the duodenum, 22 in the ileum and 7 in the appendix. As compared with Lubarsch's figures for colon and rectum, the series of 104 cases was divided equally between these two sites.

Most cases of cancer of the large intestine occur in the fifth and sixth decades, but the maximum age incidence for carcinoma of the colon is slightly earlier than that for carcinoma of the rectum. The disease, however, may occur at any period of life.

Combining all age periods, cancer of the large intestine is more frequent in males than in females, and there is no apparent significant difference between colon and rectum. If the two sexes are examined separately it is found that the maximum age incidence for females is somewhat earlier than that for males. In the fourth and fifth decades the percentage of females affected is definitely greater than of males and to a lesser extent this applies to the sixth decade. These differences are more apparent as regards cancers of the colon than those of the rectum.

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Race distribution has not been studied in large series. Of the 104 cases color is mentioned in 100, and only 2 of these were negroes. This is probably significant because there is a large negro population in the community and in the hospital.

A study of anatomical distribution of cancers of the large intestine shows that slightly more than half occur in the rectum. Of the other half, about one third are found in the sigmoid, one third in the proximal part of the colon up to and including the hepatic flexure and the other third in transverse colon, splenic flexure and descending colon. There is no predilection for hepatic and splenic flexures.

The simplest anatomical classification is into (1) projecting or polypoid, (2) infiltrating and ulcerative, and (3) stenosing. Since these are descriptive terms, combinations may be made. Mucin production may occur in any of the gross and microscopic forms but is most common in the infiltrating fairly well differentiated adenocarcinomas. The term mucinous carcinoma is more literally correct than colloid carcinoma and is to be preferred. The character of the tumor is determined by its cellular content and arrangement rather than by an incident production of mucin.

Local extension and metastasis of rectum cancers is somewhat more frequent than in colon cancers, probably because of differences in lymphatic drainage. Of the cancers of the colon metastasis occurs in decreasing order of frequency from sigmoid, descending colon, transverse colon, hepatic flexure, splenic flexure, ascending colon (Hayes). Metastasis to structures other than lymph nodes is principally to liver, but lungs are not infrequently affected and there may be a generalized carcinomatosis including bones. Of great importance is the fact that lymph nodes near a cancer of the large intestine may be notably enlarged as the result of hyperplasia and may attain a diameter of more than 10 millimeters without being the seat of metastasis.

Polypi of the large intestine are of fairly frequent occurrence and often one or more in a gut the seat of multiple polyposis are malignant. The malignant change begins in the periphery and center and subsequently extends to the base. Polyposis is the best established precancerous lesion and probably originates in local epithelial hyperplasias. That all cancers of the large intestine originate in polypi, as has been claimed, has yet to be established. The fact that a cancer is a projecting polypous mass is no proof that it originated as a polypoid adenoma. To state that as cancer develops in one polyp the others disappear does not seem to have adequate proof. From Schmieden's clinic comes the report that 40 per cent of rectal cancers originate in polyps, and this appears to be the most amply supported statement in the literature.

Grading of large intestine cancers on the basis of microscopic criteria is of interest but has not as yet been adapted to a sufficiently large number of cases. As regards rectum it is probable, according to Stewart and Spies, that as anaplasia is more and more marked, the age incidence, duration of symptoms and length of life decrease. According to Rankin and Broders the more anaplastic the tumor the greater the incidence of metastasis, and the prognosis is determined more by the grades than by any other single factor. Indeed, they state, grade I cancers with metastasis have practically as good a prognosis as grades III and IV without metastasis. Of 100 cancers in our series of which material was available for microscopic grading it was noted that cancers of the upper colon as compared with cancers of the sigmoid and rectum show a high incidence of the anaplastic cancers of grades III and IV. This rate was due especially to the number of anaplastic cancers of the cecum and ascending colon. This contrast might not be so apparent in a larger series of observations. It cannot be said on the basis of this material that the correlation of grade, metastasis, duration and prognosis noted in the rectum is applicable to the upper colon, because the number of observations is too small. In general there is no reason for assuming that practically the cancers of

the colon are more disastrous to the patients than those of the rectum. Hence the importance of the microscopic grades in the upper colon cancers can be of use principally in making comparisons between cancers as they occur in that part of the intestine rather than as a basis of comparison between those in the colon and those in sigmoid and rectum.

MALIGNANCIES OF THE COLON*

THE MEDICAL ASPECT

THOMAS R. BROWN
Baltimore

To me the medical aspect of malignancies of the colon is simple. It has but one objective—the making of a relatively early diagnosis, or, perhaps better put, the earliest possible potential, if not definite, diagnosis, so that the only effective therapy—surgery—may be utilized with a maximum chance of success. This is the only treatment worth considering at the present reading and to produce the greatest number of cures and to minimize the number of failures must be our great desideratum. Helping us is the fact that these malignancies in the main grow very slowly and as a rule metastasize late; hindering us is the fact that there is no characteristic symptom complex for there may be no symptoms or the symptoms may be so vague, so indefinite, so banal or commonplace that they will arouse no suspicion of serious trouble—a suspicion that would lead to the careful examination of the patient with the utilization of the necessary physical and chemical procedures that should lead to the correct diagnosis in the vast majority of cases. Of course a very early diagnosis can never be made except by accident for the life of these growths is far longer than usually believed. There must be a long latent period where diagnosis is impossible, but on the other hand there are very few of these cases in which the correct or at least probable diagnosis should not have been made months or even in some cases a year or more earlier if one had suspected its possibility and had set in train the proper investigations.

Cancer of the digestive tract *in toto* is the most common form of neoplasm. Cancer of the stomach, according to the Mayo statistics, is met with about as commonly as cancer of the entire large bowel; and while carcinoma of the rectum makes up one-half or three-fifths, or perhaps even

*Delivered before The New York Academy of Medicine, February 4, 1932.

more of large bowel neoplasms, nevertheless there is an appalling number of deaths in colonic new growths, many of which should have been prevented.

We do not know the cause of cancer of the colon; trauma may play a rôle, for the seats of potential injury by the fecal column, the sigmoid, the cæcum and the flexures, are in that order the sites of predilection. But the evidence is scant. Newcomb has shown there is little or no evidence of its origin from decubital ulcer; though Göckel collected a few cases from the literature apparently due to foreign bodies and a few rare cases have been reported secondary to tuberculous ulcer or to fecaliths associated with an appendical lesion.

Deaths from acute infections and from tuberculosis are steadily decreasing; deaths from cancer just as steadily increasing, an increase not accounted for by constantly improving diagnostic procedure and correspondingly better diagnosis. Something in our modern life, some of the incidents and accidents of an increasingly complex civilization—the emanations of modern life as it were—may contain the germ of such a cause. Is it our modern diet, with in some cases marked preponderance of animal protein; in other instances, the elimination of the more primitive types of food? Is it our habits of eating or may the tension and strain under which we live with their inevitable functional disturbances of the digestive tract play a part? Is it due to toxins or poisons peculiar to a modern environment? Why should digestive cancer be so rare among the primitive peoples of South America? Why does McGarrison see practically no cases in his abdominal surgery on thousands of hill dwellers in Northern India? Why such variation as to incidence in various countries? Does heredity play a rôle? Is there a contagious element? Until these questions are answered and until we know the cause our early diagnosis can only be made by the crude tests at our command.

It is a disease of later life, the fifth, sixth and seventh decades. Males are more frequently affected than females

and its growth is relatively slow. Billroth reported many years ago a case lasting ten years; but cases have been noted in early life and here the course is as a rule more rapid. Bernoulli more than twenty years ago collected 50 cases in patients under twenty years of age.

Large bowel cancer causes from 5 to 10 per cent of all deaths; it is the commonest cause of large bowel obstruction. According to some, 90 per cent of the cases are of this origin. It has an extremely high death rate. It may be multiple and while usually this is due to extension or metastases, Rankin and Bargen have recently reported sixteen cases from the Mayo Clinic with two or more primary lesions. Some of these are certainly due to malignant degeneration of multiple polyps. In the vast majority of cases it is primary; but cases have been described secondary to carcinoma of stomach or gall bladder.

Adenocarcinoma is the commonest form, but scirrhus is not rare and medullary and colloid forms are also seen.

The proximal half of the colon, rising as it does from the foregut, presents a somewhat different picture from the distal half. It has a better blood and lymph supply; its lumen is larger; the medium is more fluid and the absorptive qualities better. There is certainly a greater tendency toward the development of the more cellular types, with more tendency to bleeding, earlier and more marked systemic symptoms and possibly earlier metastases. In the distal half, the scirrhous type is probably more common with less systemic but earlier obstructive phenomena, with possibly later metastases. On the other hand, both forms are rather striking by the lateness of their metastases in the majority of cases.

Moynihan has called especial attention to the fact that constipation is the rule in left colonic growths, is rare in growths on the right side; while in a recent series with obstructive symptoms, 87 per cent were due to the former and 13 per cent to the latter.

The large, soft, fungating and encephaloid cancer of

cæcum and ascending colon rarely causes obstruction. Metastasis by blood or lymph channel is often surprisingly late. It often bears no relation to the size of the growth. A large growth of long duration may show no metastases; a small absolutely unrecognized scirrhus in the sigmoid may have an enormous metastasis in the liver which may be regarded as the primary lesion.

The general or systemic symptoms—anemia, loss of weight, strength and appetite, with an achlorhydria or low acid gastric reading—are late symptoms and the diagnosis should antedate their appearance or at least their marked manifestation. Sometimes on the other hand they may be the only symptoms and in every case with such symptoms and with no obvious cause, intestinal neoplasm should be considered as a potential factor, and careful physical and digital rectal examinations made as well as radiographic, fluoroscopic and stool studies.

According to Moynihan, the average duration of symptoms, of which the patient complained before the diagnosis was made, has been seven to nine months. In my series I have many cases in which the symptoms had been present for six months, in some for over a year, and in a few over eighteen months before the condition was suspected. The reason for this of course is that the digestive symptoms are often so vague as to arouse no suspicion. In the main they represent reflex or local phenomena due to stenosis of varying degrees or to ulceration and are usually regarded as simple dyspepsias, mucous colitis, intestinal neurosis, mild attacks of intestinal colic, progressive or periodic constipation, or occasionally even apparent diarrhœa, the latter not very uncommon in large soft ulcerating growths and sometimes being a false diarrhœa due to local irritation but in reality representing progressive obstruction above the lesion.

Some cases begin with an acute obstruction; in some, weeks or months may elapse between the mild or severe obstructive attacks while the general health of the patient may be affected little or not at all for a long period of time

because after all in certain of these cases, notably of the scirrhous type, the symptoms are entirely of mechanical origin not of a toxic origin. In a few cases the symptoms are entirely gastric—anorexia, nausea, vomiting and epigastric distress—notably in cæcal neoplasm; while of course these gastric symptoms are present in a marked degree if the obstruction is great. The colon is sometimes considerably distended above the obstruction. Rankin has decribed three cases of true megacolon. Visible peristalsis is rare; much less than in growths of the small intestine. As a rule, the lower the obstruction, the less marked are the reflex gastric symptoms. Sloughing away of a portion of the growth may relieve the digestive phenomena for a long period of time, while the therapy based on the conception that the symptoms are due to an irritable colon with the inevitable treatment by local heat, antispasmodics, low residue diet and lubrication, unquestionably may delay our diagnosis considerably by the marked temporary relief from such measures. According to Anschütz pain is present in about 63 per cent of the cases, less according to my observation, and usually in the form of intermittent discomfort, which is usually rather diffuse in the lower half of the abdomen, rarely well localized though sometimes especially marked in the umbilical or sacral regions.

Thus the symptoms may be nil, may simulate intestinal or even gastric dyspepsia or mucous colitis, or may be regarded as simple constipation, but, and this is the crux of the situation, the symptoms as a rule come out of the blue. They appear, although sometimes very gradually, without cause; they continue, albeit often with long periods of remission, irrespective of treatment. However, as mentioned before, the appropriate treatment for the suspected condition, especially mucous colitis or constipation —a smooth diet, lubrication, oil by rectum, etc.—often lulls us into a false sense of security by its quick relief of symptoms and often delays our diagnosis; unless, and this should be the invariable rule, we always consider such cases as potentially malignant and with repeated physical

examinations, fluoroscopic and radiographic studies, especially by barium enema, and repeated stool studies we rule out such possibilities. A few cases may present only toxic symptoms. In a few, almost complete obstruction may be the first sign; while in very occasional cases a single large hemorrhage may be practically the only symptom but in the vast majority of cases, probably in 90 per cent or more, the commonplace symptoms mentioned above are found.

We must of course never forget that partial obstruction and ulceration be it tuberculous, benign, or malignant, can give in many respects the same picture. But if such a lesion is demonstrated early, correct diagnosis can usually be made by further tests and surgery can be utilized relatively early.

In the majority of cases diagnosis of colonic neoplasm is ours for the asking if we but suspect its possibility, and yet the average duration of the symptoms has been many months before the true cause has been suspected. Without a suspicion the proper diagnostic procedure is not inaugurated and weeks, months and even a year or more may be wasted before the true condition is determined.

Yet even in the case of these instances of late diagnosis, it is surprising how many are susceptible to surgical treatment because of their lack of tendency to early metastasis. Case after case has come into our Clinic which has been treated for months for nervous indigestion, mucous colitis, dyspepsia and constipation and which proved to be carcinoma of the colon; and yet in the vast majority of such cases they should have been suspected for the symptoms came on without cause and persisted, sometimes with remissions, irrespective of treatment. Pain or discomfort was present in certainly something more than one-half of the cases, and this pain was usually below the umbilicus. Quite a few had epigastric distress. Definitely progressive constipation was the striking symptom in certainly one-half of the cases.

The older laboratory methods, the Kaminer Freund reaction, the increased hemolytic property or anti-trypsin of the serum, Ascoli's surface tension test, the complement fixation test and the finding of specific proteolytic ferments in the blood have no longer a place in diagnosis. They are unreliable and in the main unnecessary, for thorough physical examination, sigmoidoscopic study, examination of the stool for occult blood, and x-ray studies, especially fluoroscopic studies with the barium enema, should and usually do give us our diagnosis.

Of course none of these is infallible. In certain cases differential diagnosis is difficult or impossible. Abdominal palpation is often marvelously aided by examination of the patient in a hot bath. Fecal tumors and the very occasional foreign bodies may sometimes be very deceptive and quite obviously the lower bowel should be thoroughly emptied by enemata, sometimes repeated enemata, before making a diagnosis. A local spasm may show definite defect in the x-ray but belladonna or sodium nitrite and oil instillations usually give us our diagnosis. In some cases the history is characteristic, the tumor may even be palpable but the x-ray show no defect for some tumors in their growth do not constrict the lumen of the gut. A small growth with a slight obstruction in a redundant sigmoid may be very difficult to demonstrate by x-ray study, even by the use of more modern methods, distentions by air, various of the newer opaque mixtures, etc. In a few cases in fact even an exploratory laparotomy and careful palpation has failed to reveal the growth and yet a few months later, the lesion may be palpable, demonstrable and sometimes inoperable.

A tuberculous cæcum may only be differentiated from carcinoma by evidence of tuberculosis elsewhere or by its response to ultra violet light or cod liver oil and fruit juices. Pericæcal inflammation with mucosal ulceration due to an old and forgotten or never recognized appendical attack, especially if the appendix be retrocæcal, may absolutely simulate neoplasm; although as a rule careful

analysis of the history, a leucocyte count, temperature readings, etc. should give us the correct diagnosis.

The reverse is also true and sometimes what was regarded as a cæcal and appendical inflammatory mass proves to be neoplasm. Various inflammatory lesions—diverticulitis, polyposis, localized specific or non-specific ulcerative colitis, and possibly sigmoiditis or perisigmoiditis—may be difficult to differentiate from carcinoma; while tumors of neighboring organs, stomach, liver, ovary, kidney or pancreas may produce very puzzling pictures with persistent defect due to pressure and some obstructive symptoms.

Halstead years ago called attention to the possibility of pancreatic tumors and pancreatitis simulating new growths of the transverse colon. Recently I have seen a case of very rare œdema of the pancreas with mild pancreatitis with marked vascular engorgement, without disturbance of pancreatic function, absolutely simulating such a growth.

Perforation into a neighboring viscus—stomach, vagina or bladder—may blur the picture and arouse suspicion in the secondary and not the primary lesion. I have recently seen three cases of gastrocolic fistula due to colonic new growth where the symptoms were almost entirely gastric, a foul taste, regurgitation of fetid material, etc., and where diagnosis was beautifully shown first by barium enema and then by giving methylene blue solution by rectum, at the same time withdrawing the stomach content by tube.

In rare cases, sarcoma and lymphosarcoma must be differentiated. This is important because these in my experience are practically the only growths susceptible to ray therapy. Finally benign tumors must be eliminated because while they are rare, they are possible, and if associated with ulceration are sometimes very difficult to differentiate; adenomatous polyps, adenofibromata, lipomata, myomata and adenomyomata, angiomata, cystic tumors,

simple polyps, lymphogranulomata, dermoid and echinococcus cysts must be considered.

Careful study of the history, very careful physical examination and the barium enema generally can differentiate these benign neoplasms, but even the barium enema under the fluoroscope, while very valuable is not infallible. It may miss small growths that are present, it may diagnose growths that are absent, and in the difficult cases everything must be utilized to make a diagnosis, history, physical examination, x-ray studies, stool studies, sigmoidoscopic and proctoscopic examinations.

Treatment.

As to treatment, I can see nothing but surgery. Colloid selenium, copper and lead have proven singularly ineffective, although occasionally I have felt that the growth has become smaller and the obstructive symptoms less marked after the administration of selenium; although of course this may have been but a coincidence. Deep x-ray and radium therapy have given me no help in carcinoma of the colon except in an occasional colloid growth where an unqestionable arrest, albeit temporary, has occurred. Ray therapy is worth trying however in the rare sarcomata and lymphosarcomata, which are found in about one per cent of malignant growths of the colon, which in certain cases are possibly traumatic in origin and which rarely produce obstructive phenomena but often bleed extensively with a rapid development of anemia.

The surgical mortality is still high, in a recent series being 19 per cent, and some clinicians oppose surgical treatment because of this mortality as this is a disease of older people whose probable life span is not very great and in whom growth is often very slow—cases of four, five, six and even ten years duration having been reported. But I cannot accept this view because to me all these cases are potentially surgical and with early diagnosis and perhaps an ever improving technic, we should get a greater and greater number of permanent cures.

If the case is inoperable or the patients refuse surgical treatment, our treatment must perforce be purely symptomatic—a smooth, a soft and then a liquid diet, with little or no residue, lubricants and simple laxatives, enemata, oil instillations, sedatives and other measures to lessen pain and promote comfort.

As I look back over the years with their many cases of colon malignancy, I am struck by two facts; first, the vagueness of the early symptoms and yet, second, by the possibility of making a much earlier diagnosis in the vast majority of cases if we be suspicious of all symptoms.

In this paper I have touched on some of the means of making an early diagnosis, the methods employed in giving us as complete a picture of the colon and its pathology as is possible. I have laid repeated stress upon the importance of regarding no intestinal symptom which develops *de novo* as insignificant, and have insisted upon the utilization of all means at our command to determine whether the symptom, banal and commonplace though it may seem to be, may possibly represent the first, or at least a very early, symptom of a colonic new growth.

May I therefore end my paper as I began it, with this motif; suspect every digestive symptom in old people, suspect the possibility of new growth, especially if the symptoms do not yield rapidly to symptomatic therapy! For it is the realization of this possibility on the part of the great mass of internists and general practitioners that can give these patients the only treatment that at the present writing affords a real chance of cure and that may spell the difference between potential success and absolute failure.

Even in relatively late cases, it is surprising how good the results are due to the peculiar tendency of many of these growths to metastasize late. It is far better to operate early and occasionally unnecessarily on a well founded suspicion than to delay too long with its inevitable outcome.

THE ROENTGENOLOGIC MANIFESTATIONS AND DIFFERENTIAL DIAGNOSIS OF CARCINOMA OF THE COLON*

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It is not an exaggeration to say that the roentgen ray has contributed as much to the precise and accurate diagnosis of carcinoma of the colon as it has to the diagnosis of carcinoma of the stomach. The roentgenologic signs of carcinoma of the colon, like those of carcinoma of the stomach, are distinctive and can be elicited not only at the stage when the disease is clinically apparent on account of the ulceration or obstruction which it has produced, but when subjective and objective evidence from other sources is entirely lacking or very indefinite.

In no division of gastro-enterologic roentgenology does the roentgen ray compete with the microscope in making histologic diagnoses. The roentgenologist, however, does not hesitate to exercise his prerogative as a physician to reinforce the visual characteristics of a lesion furnished by his special method of observation with such other features as topical manipulation of the diseased segment might supply. Such are the units of which the roentgenologist's conception of the gross appearance of a lesion is composed. His diagnostic efficiency depends in a large measure on his familiarity with macroscopic pathology, and on the facility with which he is able to correlate the gross pathologic picture with the roentgenologic picture. It is not an idle boast to affirm that the roentgen ray can be made to exhibit a favorable showing in competition with macroscopic examination in the diagnosis of carcinoma of the colon, and in distinguishing it from other lesions of the colon.

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Pathology

Carcinoma is by far the most commonly encountered malignant lesion of the colon. Sarcoma is seen with extreme rarity. The gross features of a nonepithelial malignant lesion usually bespeak its malignant nature, but a certain diagnosis is possible only after microscopic examination of the tissue.

Rankin classifies carcinomas of the colon morphologically into the following types:

Scirrhous or fibrocarcinoma.—In these tumors there are relatively few carcinoma cells. Fibrous tissue, however, may be so abundant that it is difficult to recognize epithelial cells. Early in its development the tumor consists merely of a small, flat, indurated area in the wall of the bowel. Gradually the intestinal tube is encircled in annular fashion. Stenosis develops with cicatricial contraction of the fibrous tissue. The names "annular" or "napkin-ring" carcinoma are descriptive of its macroscopic appearance. Ulceration is not a prominent feature, hence early in the clinical course blood or mucus is not noted in the stool, and the disease becomes clinically apparent only when obstruction begins to be manifest. As a rule the tumor itself is too small to be palpable through the abdominal wall. The mass sometimes discovered in association with it is usually a collection of scybalous fecal material proximal to the constriction.

Medullary or polypoid carcinoma.—It is important to keep in mind that polypoid tumors, which macroscopically have all the characteristics which we have learned to associate with benign lesions, are not infrequently found on microscopic examination to be malignant. In fact, it is now quite generally believed that medullary or polypoid carcinomas have their beginnings in lesions indistinguishable grossly from the simple and so-called benign polyp. It is therefore to be expected that all stages in the development of a pedunculated or broad-based polypoid tumor to the frank medullary carcinoma with extensive exposed

surfaces will be encountered. Medullary carcinomas are characterized grossly by large, soft, lobulated or cauliflower-like masses projecting into the lumen from the mucosal surface. The margins are irregular, overhanging, elevated; the floor of ulcerated areas is ragged and covered with exudate. Sometimes the intestinal wall does not seem to have been extensively invaded. More commonly, however, mural infiltration is marked and the lesion has the indurated consistence characteristic of malignancy. Necrosis and sloughing of the peripheral proliferative portions of an originally pedunculated polyp result in a flat, saucer-shaped lesion.

Gelatinous (mucoid) carcinoma.—Morphologically, this type of carcinoma of the colon might be looked on as holding a middle ground between the medullary and scirrhous forms. It becomes a circular lesion, enveloping the bowel in annular fashion, but is a much more extensive lesion than the true fibrocarcinoma. In the latter the constricting feature is apparent from both the luminal and serosal aspects. In the former, however, the wall is markedly thickened, heaping up of the malignant tissue having progressed both into and away from the lumen. The luminal aspect of fibrocarcinoma presents a short stricture with little, if any, ulceration. With the colloid type of lesion, however, the channel through the tumor is relatively long, and its luminal surface is denuded and irregular in its course. The tumor is firm and when in a situation accessible to manipulation, may be discovered clinically by the hard mass it presents.

Methods of Investigation

The opaque meal.—The earliest examinations of the large intestine were carried on with the opaque meal. It is now generally agreed, however, that this method is incapable of delivering adequate information regarding organic lesions, although it still has applications in special instances. Its property of becoming dispersed in scattered masses or accumulated in large lumps in separate segments, prevents a satisfactory estimate of the entire colon. Repeated roent-

genoscopic examinations are always required. Further, in the presence of an obstructing lesion, the opaque meal is liable to become impacted above the stenosis. It may thus be responsible for much distress to the patient, and seriously affect the prognosis by becoming the immediate cause of acute intestinal obstruction.

The opaque enema.—Almost all organic diseases of the colon produce deformity in the contours of the lumen of the affected segment. This is particularly true of carcinoma. It follows that the choice of an investigative procedure will devolve on the method which serves best to demonstrate the deformity. The opaque enema is the procedure of maximal efficiency for this purpose.

It is hardly possible to outline the technic of administering the opaque enema without placing emphasis on the necessity of clearing the colon of fecal remnants, gas and fluid before investigation is attempted. This cannot be accomplished without purgation and cleansing enemas. Saline cathartics are ill-advised as purgative agents because they produce their effect by osmotically drawing fluid into the intestinal lumen to the point of maximal distensibility. Evacuation after saline purgation is frequently incomplete and considerable time is usually required for the colon to assume a state of collapse sufficient for satisfactory observation of the opaque enema. On the other hand, purgatives the action of which depends on their property of activating the bowel by severe irritation are likewise undesirable because they are not uniformly efficient, and because of their tendency to leave the colon in such a prolonged state of irritability that retention of the enema becomes extremely difficult or impossible. Castor oil, of all the purgative agents active enough to produce adequate evacuation, is in fact a milder irritant than many others, and we consider it to be the most uniformly efficient purgative agent available for our purposes. The patient to be examined abstains from his evening meal and takes 2 ounces (60 c.c.) of castor oil. The following morning, before the examination, the distal portion of the colon is cleansed with a few normal saline enemas. It is assumed

that the castor oil will have achieved this result in the proximal segments. This procedure usually effects a satisfactory preparation, and the routine is broken only for patients with very severe diarrhea, for those who have a tendency toward severe intestinal hemorrhages, and occasionally for patients with acute or subacute obstruction.

Occasionally a patient experiences undue difficulty in retaining the enema, and sometimes when there is reason to believe that considerable intestinal spasm accompanies the suspected lesion, the administration of an antispasmodic drug often proves helpful. It seems hardly necessary to point out that the drug must be administered to full physiologic effect. Inhalation of amyl nitrite at the time of examination sometimes answers the purpose, but atropine in the form of tincture of belladonna is more efficient and reliable. Sixty drops of the tincture, divided into three equal doses, two of which are taken at an interval of two hours the evening before the examination, and the remaining dose within an hour before the examination, is a dependable form of administration.

Some attention should be devoted to the preparation of the enema itself. Since the roentgenoscopic observation of the opaque enema is the keystone procedure in the roentgenologic examination, the enema must contain a concentration of the basic opaque substance sufficiently high to yield maximal contrast. The opaque material in the enema should be minutely divided, uniformly suspended, and the suspension should be well sustained. Simple suspension in water by agitation is inadequate on account of the rapidity with which the salt is precipitated from such a mixture. Several commercial preparations of barium sulphate are available which are satisfactory in this respect, or a suspending agent, such as gum acacia, may be added to the mixture when it is prepared in the laboratory. The consistence of the suspension should approximate that of heavy cream. It is most important that the temperature of the enema be kept at or slightly above the temperature of the body, because the colon reacts violently at times to the direct application of cold.

With the patient in the recumbent position the enema is administered slowly and steadily, under constant roentgenoscopic observation from the time it enters the rectum until the cecum and terminal coils of ileum are visualized. This is necessary in order to detect abnormalities which may later be hidden by an overlying loop of normal bowel. As the examination progresses the patient is rotated from side to side to obtain views at different angles. These maneuvers, coupled with careful palpatory manipulation, are essential parts of the examination.

Although the roentgenoscopic observation of the opaque enema is the basic and cardinal roentgenologic procedure in the investigation of the colon, it must not be inferred that roentgenography is unnecessary or superfluous. A well executed roentgenogram will often provide invaluable supplementary information which was not so clearly available at the roentgenoscopic examination. On the other hand, the practice of administering the opaque enema, and confining the investigation of the colon to the examination of one or two roentgenograms in different positions is so inadequate that it is mentioned here only in condemnation. Roentgenograms usually are made with the patient in the prone position. It will often be found necessary, however, to place the patient in an unusual position, or to use some form of compression so that the lesion can be projected on the film to best advantage (fig. 1).

Demonstration of mucosal relief.—This relatively new and very interesting method of investigation, sponsored especially by Knothe, Berg, Forssell and others, should be given a place among the valuable diagnostic procedures. Although workers in this field generally advise against the use of purgative agents when this method is employed, the examination of the mucosal relief can be carried on after the evacuation of the enema administered as has been outlined. Essentially the method consists of a study of the relief patterns assumed by the mucosa of the intestine covered with a thin coat of opaque material. The lumen of the colon must be thoroughly cleansed beforehand. The opaque enema is then administered under roentgenoscopic

Fig. 1

Carcinoma (note arrow) involving the descending colon near its juncture with the sigmoid. At the left the lesion is exposed by a slight rotation of the patient to the right and by the overlying loop of transverse colon being separated by the hand of the patient. At the right is the roentgenogram made in the routine manner with the patient in the prone position. A lesion cannot be seen.

control after which the opaque material is evacuated. The mucosal relief is inspected both on the screen and on films. Experience at The Mayo Clinic with this procedure is too limited to permit a reliable opinion about its value. Correct interpretations of these not uncomplicated mucosal states will be born only of judgment acquired by long experience and carefully controlled observations.

The use of gases as contrast substances.—Long before the introduction of inert salts of heavy metals, investigations of the alimentary tract, especially of the stomach and colon, were carried on with the use of gases, chiefly air, as contrast substances. However, they never were universally employed. In special instances, when for some reason the use of opaque salts might be inadvisable or contraindicated, the inert gases may serve a useful purpose. It is possible to obtain a satisfactory outline of the colon by insufflation, but the picture lacks the distinctness necessary for accurate diagnostic work.

Combined methods of examination.—The first method, a combination of the opaque meal and opaque enema, hard-

ly merits the name of a special procedure. It is applied only when the opaque meal has met with an obstruction and the opaque enema is used to determine the distal limits of the stenosis. The warning to exert every effort to prevent a large mass of insoluble and inert material from accumulating proximal to an obstruction bears repetition in a criticism of this practice. The danger of impaction and complete intestinal obstruction can scarcely be overemphasized.

The second method is a combination of the opaque meal and insufflation. Laurell, in 1921, described a method of examination of the proximal segments of the colon by administering the opaque meal, waiting until such time as the meal was transported to these segments (four to five hours), and insufflating with air. The same objections apply to this method as apply to the opaque meal when used alone. It has not received wide application, and is not nearly as useful as the following method.

The third method is a combination of the opaque enema and insufflation, or the "double contrast" method. Fischer, in 1923, described a method of investigation which will be found to be of greatest value especially for the demonstration of the nondeforming intraluminal lesion of the colon. Essentially the method is an attempt to coat the luminal surface of the bowel with a thin coat of opaque material, and then to distend the lumen with air. It thus provides what is in reality a transparent medium. Weber suggested several technical modifications which he believes makes the "combined method" more readily interpreted, and emphasized the value of stereoroentgenography with the technic. He pointed to the superiority of this method over all others for the demonstration of polypoid lesions and polyposis of the colon, and exhibited lesions not otherwise demonstrable roentgenographically.

The technic may be carried out to good advantage as follows: Complete removal of all solid, fluid, and gaseous accumulations is an unconditional prerequisite. The opaque enema is then administered under roentgenoscopic

control. The colon is filled as rapidly as is compatible with the comfort of the patient and note is made of any abnormalities apparent. When the cecum has been filled the patient is allowed to evacuate the enema as completely as possible, and it is usually found that about the proper amount of the opaque material remains in the lumen of the bowel. No more than a uniform thin coat is desirable. If large collections of the material are still seen after the attempt at evacuation the rectum can be insufflated with a volume of air sufficient to induce a desire for defecation, whereupon the patient will usually return with as near the ideal distribution and concentration of the opaque material as is possible in his case. A hand blower is used for insufflation. The colon is inflated under roentgenoscopic control, and care is exercised not to over-distend any of the segments. The procedure is facilitated by frequent rotation of the patient on the roentgenoscopic table, and by manipulation of the bowel through the abdominal wall. Insufflation carried out in this way has not been in any way more distressing to the patient than might be expected from the administration of the opaque enema.

As soon as the cecum has been moderately distended the enema tip is removed from the rectum and stereoroentgenograms are made with the patient in the prone position. The fluoroscopic image of the air-filled colon lacks sufficient detail to have diagnostic value. The grid diaphragm is of distinct advantage in educing the fine detail requisite for precise demonstration of the anatomic character of the lesions.

This technic is not recommended as a routine procedure. Compared with the barium enema it is cumbersome, relatively expensive, and may offer little additional information especially in those diseases which produce deformity of the lumen. Its greatest advantages lie in its adaptability for demonstrating otherwise obscure, small, nondeforming lesions, and those which may have been clearly and adequately visualized roentgenoscopically, but which are persistently obscured on the roentgenogram by overlying loops filled with dense opaque material. Unquestionably

the method makes a valuable contribution to increased accuracy and general efficiency of diagnosis of diseases of the colon.

Roentgenologic Signs of Carcinoma in the Colon

Early carcinoma.—Roentgenologic methods are expected to reflect only the gross anatomic characteristics of pathologic processes. From the histologic studies of Schmieden, Schmieden and Westhues, Doering, FitzGibbon and Rankin, and others, it is known that many polypoid lesions of the colon, benign grossly, are in fact carcinomas. Some of them have a tendency to develop malignant characteristics, and it has been shown very definitely that at least some well-defined malignant growths in the colon have their beginnings in these macroscopically benign polypoid lesions. The earliest stage of a malignant process, then, that the roentgenologic method is likely to uncover, is this type of lesion. The term "polypoid lesion" is used advisedly to include any sessile or pedunculated growth projecting into the intestinal lumen, without special reference to the histologic nature of the tissue of which it is composed. It is not possible accurately to determine the cytology or the malignancy of such lesion without microscopic examination, but adenomas, fibromas, myomas and lipomas are the most common types encountered.

The significant roentgenologic features of these lesions are their intraluminal situation and their prevailing failure to produce a roentgenologically demonstrable deformity in the colonic contour. When these tumors are large and situated in segments accessible to palpation the roentgenoscopic examination will give reliable evidence of their presence. Without palpation a momentary split in the column of the enema as it ascends will most frequently be the only indication of the presence of a polypoid lesion. Approximating the walls of the colon, however, will serve to bring out the characteristic smooth, sharp, evenly rounded or ovoid contours of the central defect. The marginal contours of the colon may be unaffected. The wall of the bowel remains pliant, peristalsis is not hindered,

and only rarely is a mass palpable in association. Ulceration, irregularity of contour of the polypoid lesion itself, evidence of induration or increased local rigidity of the wall of the colon at the site of the lesion, signify infiltration, hence malignancy. Thus it is apparent that the evidence for the presence of these lesions is largely roentgenoscopic. Roentgenography is successful only when conditions are favorable for approximation of the walls of the barium-filled bowel by compression. These considerations apply only to polypoid lesions which are large and which are accessible to manipulation at the time of roentgenoscopy. It is probable that polypoid lesions 2 cm. or less in diameter will almost always elude most careful roentgenoscopy, or will leave the examiner in an insecure state of mind regarding the reliability of his interpretation.

The opaque enema has not produced as reliable and accurate results in the demonstration of polypoid lesions of the colon as the opaque meal has yielded in the demonstration of similar lesions of the stomach. Before the "double contrast" method was available it seemed that the escape of many of these lesions, especially of the smaller ones, from roentgenologic detection, was inevitable. But the use of this roentgenologic procedure has made it possible, not only to detect many more lesions of this type than was previously possible and to project them roentgenographically, but also to complement less decisive roentgenoscopic data with the precise intraluminal picture which the method provides. Polypoid tumors occurring singly or those relatively sparsely distributed, are visualized as rounded, soft projections into the intestinal lumen. Their contours are outlined vividly in the air-distended bowel, and it is possible, when sufficient care has been exercised in carrying out the details of the technic, to determine the character of the surface contours of the growths (fig. 2). Properly applied, the method affords an estimate of the integrity of the interior of the colon attainable by no other method except direct visualization by the proctosigmoidoscope, or surgical or postmortem exploration. Be-

Fig. 2
Elongated polypoid tumor (note arrow) in the descending limb of the splenic flexure. This tumor had escaped roentgenoscopic detection because the involved segment was not accessible to permit approximation of the walls of the colon.

cause the combination of air and a thin coat of opaque material applied to the mucosal surface provides what is essentially a transparent medium, the method is profitably extended to present more clearly a lesion which may have been more or less adequately visualized roentgenoscopically, but which is obstinately obscured in the roentgenogram by overlying loops filled with the dense opaque contrast material of the barium enema.

Mature carcinoma.—Obviously most patients are sent for roentgenologic investigation of the colon when they

have presented a syndrome directly or indirectly referable to a lesion in the colon. When carcinoma is responsible even for vague symptoms it has developed morphologically to the extent that it is not only roentgenologically apparent as a lesion, but, with the exception of the polypoid lesions, its differential characteristics are manifest as well. This observation is based on experience with a considerable number of well-developed malignant lesions discovered roentgenologically in the course of routine examinations, when the expectancy for such discovery was very remote.

The filling defect is the essential roentgenologic sign which must be demonstrated before carcinoma can be diagnosed. The defect is defined as a subtraction from the normal outline of the colonic shadow, and may be central or marginal. It is produced chiefly by protrusion of the growth into the lumen of the bowel, and partly by diminished distensibility of the infiltrated wall. A certain amount of deformity is usually contributed by local spasm. The roentgenologic picture is in fact the shadow of a barium cast made with the lumen of the bowel as the matrix. Hence the filling defect produced by a given lesion will correspond with the luminal contours of the lesion. The extraluminal characteristics of the lesion are discernible only by inference from palpatory manipulation of the diseased area. It follows that the roentgenologic manifestations of carcinoma will vary within certain limits, depending on the morphologic character of the lesion encountered.

The filling defect of the scirrhous or fibrous carcinoma is short, and concentric. Its annular character is its most prominent feature. Ulceration is practically never demonstrable, and fixation to adjacent organs is rare, so that the lesion is uncommonly mobile. The tumor itself is usually so small that it is not palpable. The mass clinically so frequently associated with this type of lesion usually cannot be discovered at the roentgenologic examination if the preliminary preparation has been carried out faithfully. As in all instances of carcinoma, but particularly in this type of lesion, the demonstration of the filling defect is conditioned on the degree of patency of the involved

segment. When the constriction is pervious to the enema, and obstruction of sufficiently high degree exists, dilatation of the intestine proximal to the lesion is apparent (fig. 3). With these small annular lesions complete ob-

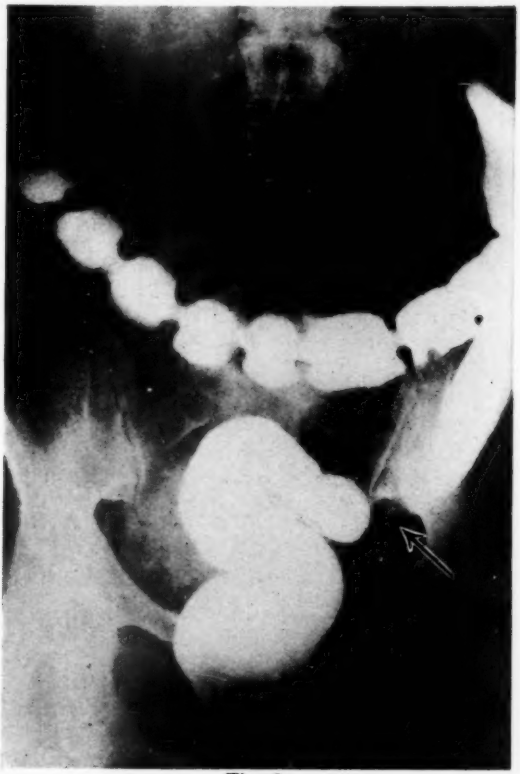

Fig. 3
Small annular carcinoma (note arrow) involving the upper portion of the sigmoid.

struction to the enema is most frequently encountered, and the canal of the filling defect is not visualized. In most cases, however, the constriction has permitted the fecal current to pass in the physiologic direction. Retrograde obstruction is caused either by a high-grade diminution

in caliber of the affected segment, or by the establishment of a valve mechanism in which lateral pressure is applied to the constricted area as the medium accumulates under force in the normally distensible bowel immediately adjacent to the lesion. In the former instance the barium column terminates in a conical, usually smooth, although sometimes ragged, projection (fig. 4); in the latter, it terminates in two convex smooth eminences on each side of the central constriction.

Fig. 4
Annular carcinoma in the transverse limb of the splenic flexure. This lesion produced complete obstruction to the enema and was not pervious to insufflation.

The appearance of the polypoid type of carcinoma varies within wider limits, depending on the size of the growth, the extent of ulceration, and the amount of mural infiltration. Deformity of the luminal contour is not the most striking feature of these lesions. More characteristic is the presence of lobulated, cauliflower-like masses projecting into the lumen (fig. 5). Displacement of the opaque material from their surfaces by approximating the walls of the affected segment with manual pressure presents the characteristic picture. Ulceration is revealed by the mass of opaque medium adhering to the ulcerated floor of the crater which is

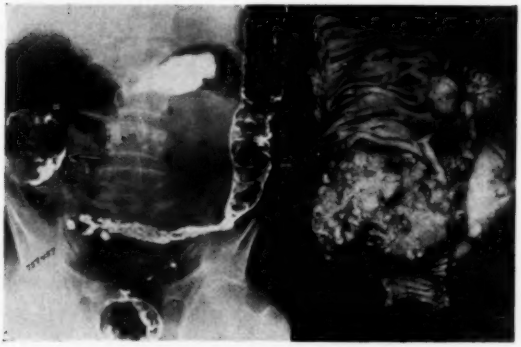

Fig. 5

Polypoid lesion (note arrow) involving the ileocecal juncture. Microscopic examination of the resected specimen showed the lesion to be an adenocarcinoma.

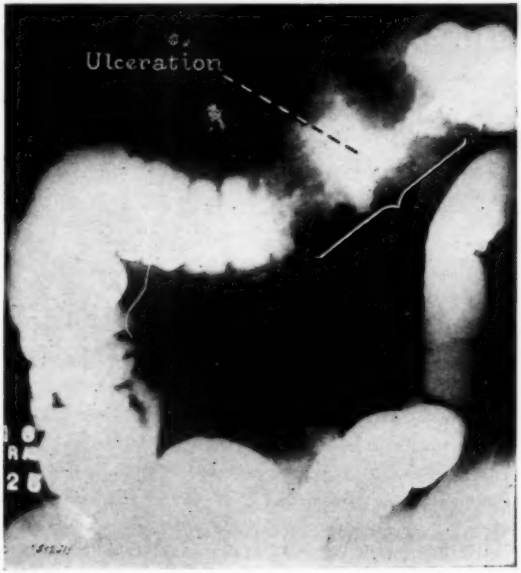

Fig. 6

Extensive ulcerating carcinoma in the transverse colon near the splenic flexure.

usually deep and bounded by irregular, overhanging margins (fig. 6). In the cecum and ascending segments of the colon, the polypoid lesion commonly involves only a portion of the circumference; in the narrower, more distal segments, however, the entire circumference is usually included.

The filling defect produced by the third type of carcinoma of the colon is again quite uniform in appearance. The tumor protruding into the lumen of the bowel produces a constriction which is longer in extent than that produced by the annular scirrhous type. The luminal aspect of the tumor is denuded and rough, which is reflected roentgenologically by markedly irregular and jagged contours and the tortuous course of the channel (fig. 7). The demarcation between normal and pathologic tissue is very abrupt, hence the termini of the filling defect have sharp contours, and tend to have a barbed or gnarled appearance. The tumor itself is usually large enough to be palpable through the abdominal wall, and the mass has the indurated knotty consistence associated with malignant tumors. Fixation may be present or absent. Complete or incomplete retrograde obstruction sometimes takes place, usually by the establishment of a valvular mechanism similar to that

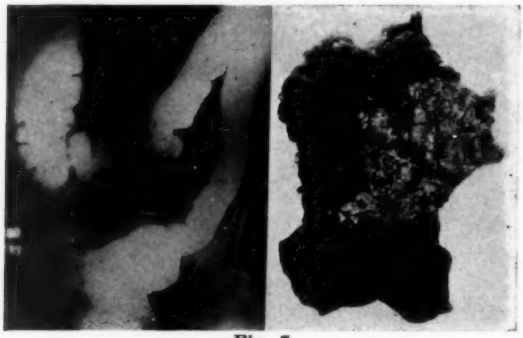

Fig. 7
Carcinoma (note arrow) involving the middle segment of the transverse colon. Attention is called to the irregular, jagged contours of the channel and to the abrupt demarcation between normal and pathologic tissue. The specimen was removed at operation.

formed with the short annular lesions. The roentgenologic appearance differs, however, in that the distal terminus of the process is represented as two symmetrically placed sharp prongs to each side of the channel through the tumor.

Differential Diagnosis

When irregularity in the outline of the colon distended with contrast material is encountered, the first problem is to determine whether the defect observed is real or apparent. Spasm is the one factor which is operative in producing distortion in the contour of the colon which is not real, although the appearance may simulate closely that of a genuine intrinsic lesion. Spastic filling defects often show their true character by changing their form or situation. At times, however, they may persist unchanged for a considerable period. Manipulation of the involved segment sometimes effaces them; often they are absent at the second examination. The effective use of antispasmodic drugs, however, is the most satisfactory method of determining the amount of spasticity operative in producing a given deformity. Not infrequently gross deformities in the outline of the colon are produced by acute or fulminating inflammatory processes in adjacent or contiguous organs. This is due either to an extension of the inflammation to the serosal surface of bowel, or to reflex spasm. At times the spasm is so marked that the lumen of the bowel is closed completely. Such a filling defect is distinguished from one due to an intrinsic lesion by the notation that it usually involves a relatively long segment, that its outline changes its form during the examination, and that evidence of mucosal change is absent. Localized areas of spasm are also encountered which are apparently reflex from acute or subacute inflammatory lesions in abdominal organs distant from the area of spasm.

Other causes of apparent rather than real filling defects are local accumulations of gas, fluid and fecal matter in the colon. These can usually be displaced by palpation during the roentgenoscopic examination, and they do not have a constant outline. Irregularities in outline caused

by pressure from other organs such as the spleen and gallbladder, from extrinsic tumors and from adjacent bony parts are readily distinguished from true filling defects by determining their extrinsic situation during the roentgenoscopic examination.

Carcinoma is not the only intrinsic disease of the colon which is manifested by the filling defect. Other tumefactive processes which produce localized deformities in the outline of the colon are diverticulitis, specific and nonspecific granulomatous lesions and benign organic strictures.

Diverticulitis is encountered practically only in the segment of the sigmoid. The filling defect produced by this disease is the result both of spasm, which may be so marked as to produce complete occlusion of lumen, and of the encroachment of the pericolic inflammatory tissue on the lumen of the bowel. It is usually possible to visualize diverticula in the more proximal uninvolved segments as rounded, knob-like projections from the lumen of the colon. Differential diagnostic points are the concentric serrated contours of the affected segment contrasted with the sharply irregular and eccentric contours of carcinoma, the maintenance of flexibility in the former compared with the stark rigidity in the latter, and the long segment involved with diverticulitis as opposed to the relatively short segment which carcinoma usually occupies (fig. 8).

Hyperplastic tuberculosis, amebic granuloma, and the mycotic affections of the bowel, named in the order of frequency of occurrence, are grouped together under the general term "specific granulomas." They are much more readily distinguished from carcinoma than they are from each other and from nonspecific granulomatous lesions. They are preeminently diseases of the "cecocolon," although nonspecific granulomas and the mycotic lesions, and less frequently hyperplastic tuberculosis, are encountered in other segments, especially in the sigmoid. The principal differential characteristic which all of these lesions possess in common is the length of the segment which

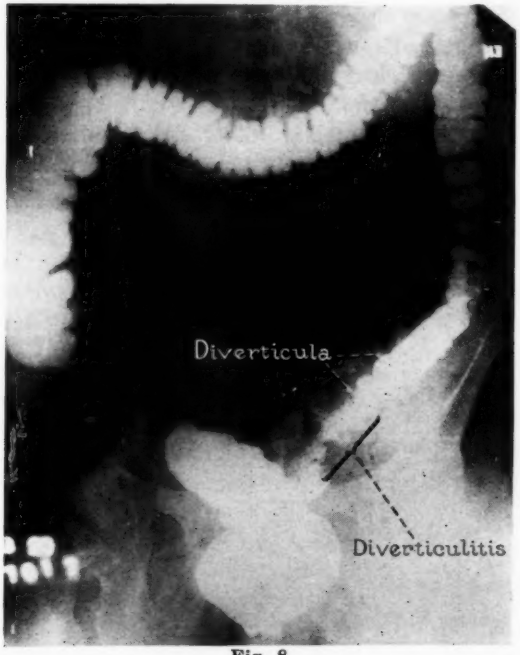

Fig. 8

Diverticulitis involving a long segment of the proximal sigmoid colon. The serrated contours and the presence of other diverticula in the more proximal segments may be seen.

they encompass in their involvement. The demarcation between the normal and the pathologic is gradual rather than abrupt, the channel of the filling defect is concentrically placed, tends to have a smooth outline, or if irregularities in contour are present, they are rounded and bulbous rather than jagged and angular. When a mass is palpable with these lesions it does not have the indurated consistence of malignancy, but is boggier and more dough-like. The lesions usually are fixed, but pliable.

Quite rarely chronic ulcerative colitis, specific or nonspecific, involves only a localized, short segment of the colon. An abrupt narrowing may be produced by such processes, and the moth-eaten appearance of the channel

makes the lesion bear a strong resemblance to carcinoma. The divergence of the therapeutic procedure which hinges on the diagnostic decision makes the differentiation highly significant. This type of lesion usually shows marked irritability; its channel is relatively broad, its margins smooth, and the lesion is pliable in spite of the marked localized mural thickening.

Organic stricture is exceedingly uncommon except as a complication of chronic ulcerative colitis. A short segment is usually involved, but the narrowing is spindle-shaped, the lesion is pliable, and has a smooth and regular outline (fig. 9).

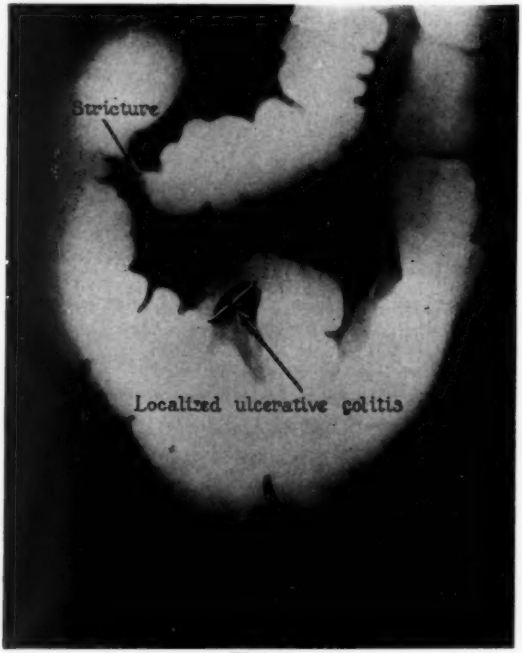

Fig. 9
Organic stricture in the transverse colon near the splenic flexure. The narrowing is spindle-shaped and the outline is smooth. The filling defect in the sigmoid was found at exploration to be an active area of chronic ulcerative colitis.

Occasionally tumefactions extrinsic to the colon produce constriction of its lumen by completely or incompletely encircling it. Pelvic tumors and masses of metastatic nodes in the abdomen have been responsible for such localized encroachments on the lumen of the colon in our experience. In spite of the marked constriction, evidence of obstruction was entirely absent in the cases of this type which we have examined. The defect, however, has none of the characteristics which we have learned to associate with malignancy.

The roentgenologic profession points with just pride to the contribution its special method of observation has made to the diagnosis of carcinoma of the stomach. Contribution to the diagnosis of carcinoma of the colon is equally gratifying, and equally important, for 10 per cent of all malignant lesions which occur in the gastro-intestinal tract occur in the large intestine or rectum. Success in the treatment of patients affected with carcinoma of the colon may be expected to advance hand in hand with the development of refinements in diagnostic methods. It is probable that a great many of the failures in treatment are attributable primarily to the late stage at which the lesion was recognized. Roentgenologic methods make it possible to recognize carcinoma in its early stages, often before there is adequate clinical evidence for suspecting its presence. The message is obvious. The disease must be recognized earlier to permit the earliest possible institution of proper therapeutic procedures. Any changes in intestinal habit, evidenced by irritability, mucous diarrhea, alternating periods of constipation, localized pain and tenderness which do not tend to disappear, not to mention tumefaction, anemia, and obstruction, all are indications for a most thorough-going roentgenologic investigation of the intestinal tract. It is not out of place to recommend that this investigation be included in the routine yearly examinations. Such measures are necessary to increase the operability of the malignant lesions encountered, and simultaneously will offer much more reasonable hope for satisfactory end results.

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SURGICAL ASPECTS OF CARCINOMA OF THE COLON*

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Given accurate localization and a relatively correct pathologic diagnosis of a malignant lesion of the large bowel, the evolution of surgical measures indubitably has made radical extirpation the present-day choice of treatment. A surgeon's questions to himself, when confronted with such a situation, are: when is the optimal time for exploration, and if the condition is found operable at exploration, what type of maneuver offers the lowest surgical mortality compatible with widespread extirpation of the growth contiguous tissues? In general, it may be said that carcinoma of the colon, as it usually presents itself, is rarely to be considered an emergency problem. In The Mayo Clinic, probably 5 per cent, or certainly very little more than this proportion of cases, is encountered giving the picture of acute intestinal obstruction. That this is not true in larger communities I am well aware, but certainly the relative number of carcinomas of the colon which produce acute intestinal obstruction in any community is an insignificant one, compared to the whole. Burgess, reviewing a large series of cases of intestinal obstruction in his hospital in Manchester, England, called attention to the fact that one-third of all cases of intestinal obstruction result from acute stenosis of the large bowel and further postulated that if one can exclude hernia and intussusception and localize the lesion to the colon, the chances are nine to one that malignancy will be found to be the cause. One might add further that almost invariably the malignant growth is situated in the left portion of the colon, and more often than not, at or near the rectosigmoid juncture.

However, it is with the larger group, that of chronic and subacute obstruction, that I am most concerned. It is relatively correct to estimate that 75 or 80 per cent of

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all patients with carcinomas of the colon, as they present themselves in the routine of work, have some form of intestinal obstruction, usually chronic, occasionally subacute, and less frequently, acute. This is true of lesions of the left half of the colon, beyond the middle of the transverse segment, for two reasons: (1) the type of growth in this section of the bowel is encircling, usually scirrhous, and tends slowly to cause stenosis of the bowel by encroachment on its lumen, and (2) the fecal content of this segment of the bowel, which is a storehouse and has little physiologic function, is hard and formed, the combination making an ideal situation for obstruction. In the right half of the colon obstruction is rare, and here the preliminary measures indicated for rehabilitation are instituted to combat anemia and toxemia, rather than the dehydration, debilitation, and starvation of obstruction. In addition to obstruction, there is present in practically all cases of carcinoma of the large bowel, as in carcinoma elsewhere, a subtle undermining of the patient's resistance, the explanation of which I am not prepared to offer, but it is certain that the very presence of a malignant lesion unquestionably produces a deleterious effect on the physiologic state and lowers resistance to secondary infection which may or may not follow surgical insult. Perhaps it may be explained, in a general way, by assuming that chronic obstruction produces in a less emphatic way the deleterious products so fulminatingly characteristic of acute obstruction, namely, the toxemia and starvation which are emphasized by changes in chemical elements of the blood, and general decrease in vitality.

The time at which exploration should be undertaken, then, depends largely on the amount of obstruction present in the individual case, if the general condition of the patient makes it reasonable, before operation, to assume that the growth has not spread beyond its local confines. A period of preoperative preparation is always desirable; it always increases the individual's chances for successful operation, and should, I firmly believe, be a distinct part of the surgical attack. This preliminary treatment per-

mits one to decompress the colon by medical or surgical means and, at the same time, to institute measures for increasing the patient's resistance to infection which may follow. It has been my custom in all of the cases in which acute obstruction is not present, to hospitalize the patients over a period of four to five days or even longer, during which time repeated flushings by enemas, coupled with mild purgation by preparations of senna, have rid the bowel of its content and have lessened some of the local infection around the growth. At the same time the patient has been placed on a residue-free diet and efforts to increase hydration and overcome inanition, desiccation and starvation, by forcing large amounts of fluids, or by blood transfusion if necessary, have been carried out. The optimal time, then, at which one seeks to attack carcinoma of the colon surgically, is when successful medical decompression has reduced the colon to a state as nearly comparable to that of the normal colon as is possible in the face of malignancy, and at the same time, has increased, by measures of rehabilitation, the physiologic status of the patient to as nearly a normal one as may be possible.

As to the method and time of decompression, I would make myself plain. In the first place, I take it that no one will attempt to decompress an acutely obstructed colon by other than surgical methods. To do so is folly and, from the patient's standpoint, fatal. It is well known, however, that subacute intestinal obstruction, which is confined to the large bowel, is well tolerated over a period of several days without changes in chemical constituents of the blood, and without the fatal prognosis so well recognized in cases of obstruction of the small bowel. Confronted with a distended abdomen, vomiting of content of the small bowel, and other signs of acute intestinal obstruction, I take it that no surgeon, or even operator, would be so unwise as to delay introduction of a drainage tube into the bowel by surgical measures. However, in the case of moderate, subacute obstruction, or of chronic obstruction, one need not fear to attempt to relieve the bowel of its content by repeated enemas and mild purgation, and if persisted in

over a period of time and watchfully carried out, such measures not only will prevent the production of acute intestinal obstruction, but will, in the majority of cases, relieve the impending obstruction and return the bowel to a relatively normal state.

When the abdomen is explored, and operative intervention is undertaken, it is highly desirable that the bowel be flat and unobstructed, and that the infection around the growth be reduced to a minimal amount. Herrmann has shown very pointedly that obstruction of the large bowel which is accompanied by an ulcerating lesion produces a condition which increases enormously the permeability of the colonic wall, and thus permits extravasation of organisms out into the pericolonic tissues. For this reason, I think, more than for any other, the spread of peritonitis which sometimes follows colonic resection may be attributable to exploration and manipulation of the growth, rather than to leakage at suture lines, or to other technical failure.

Rehabilitation follows decompression in direct sequence, and is accomplished, as I have said, by adequate hydration, blood transfusion, and attempts to increase the normal elimination and to build up the general status of the individual as much as possible over a short period of time. As a further step at increasing the protection of the patient following operation, I have found it desirable to employ, as a routine, an intraperitoneal vaccine made of streptococci and colon bacilli derived from patients who have succumbed to peritonitis. I am confident that this procedure has been advantageous. We have now used it in more than 800 cases in the last four years and are impressed with the fact that, as one measure in the sequence of factors of safety, it has proved its worth. The procedure is a logical one in the efforts to increase the patient's resistance, and, in conjunction with other measures it is desirable. The vaccine is employed as a routine before operation, being given three days prior to the resection. Usually, its administration is accompanied by a general reaction which is characterized by malaise, headache, ele-

vated temperature, and elevated pulse rate. This subsides at the end of twenty to twenty-four hours.

As an evidence of what may be expected of intraperitoneal vaccine, I refer to a preliminary report made on its use in 1928. During that year sixty cases were reported from the clinic in which operation was performed for carcinoma of the colon, with a mortality rate of 5 per cent, whereas in a controlled group of sixty cases, with identical lesions, the mortality rate was 23 per cent. That this huge reduction of mortality was certainly not entirely due to the vaccine, I am convinced; but as one of a series of factors aimed at increasing the safety of the patient against infection, I believe it was an important one. In 1931, with Bargen, I reported 222 cases of carcinoma of the colon and rectum in which vaccine was used between January 1 and October 1, 1929, and fifty-eight cases in which operation was done during the course of these months for similar conditions, but without vaccine. Eleven deaths occurred from peritonitis among the 222 cases, representing a mortality rate of 4.9 per cent, whereas in the fifty-eight cases in which vaccine was not given, there were thirteen deaths from peritonitis (22.4 per cent).

The answer to the second question, as to the type of operation by which the growth and its contiguous tissue can be removed with the lowest mortality, is governed by certain principles of physiology and surgery which I think are incontestable. When one remembers that the large bowel is a bifunctional organ, that the right half of the colon is the absorptive portion, that the left half is the storehouse, and that infection from the normal bacterial content of the intestine is ever present, it is obvious immediately that the most meticulous care the surgeon can exercise to guard against subsequent peritonitis, which is the greatest lethal factor, at the same time being enabled to remove as widely as possible node-bearing tissue with the growth, is exceedingly desirable.

The choice of operation in the two halves of the large bowel differs materially and is influenced by a number of factors: (1) obstruction; (2) the nature of the pathologic

process present; (3) the presence or absence of local metastasis, and (4) local fixation and attachment of the growth. Always, if obstruction and dehydration are present, they must be combated, the patient's resistance against infection elevated, and the ability of each patient to withstand just as formidable an extirpative procedure as is possible must be estimated. In the main, it may be emphasized that: (1) decompression, (2) rehabilitation, and (3) graded operations, are the three important principles to be followed, with slight deviation.

Unquestionably, operations for carcinoma of the colon, in the majority of instances, should be performed in multiple stages. Not only does a drainage operation or a sidetracking operation for growths in the right half of the colon reduce the infection around the growth and permit the patient's resistance to be built up for a subsequent, formidable extirpative maneuver, but it simplifies the secondary procedure and frequently allows one to undertake massive resections at the second stage, which were adjudged inopportune at the primary exploration. It has been my practice in recent years to attack practically all carcinomas of both sides of the colon by multiple maneuvers. In the right half of the colon the operation of choice, I believe, is ileocolostomy performed in whatever manner you will, so long as anastomosis is made end-to-side, rather than lateral and followed by resection at a later operation. In the left half of the colon obstructive resection, which is a radical procedure, is the operation of choice in cases in which measures of decompression have been carried out. In cases in which obstruction is unrelievable by measures of decompression, drainage by cecostomy or colostomy, to be followed by subsequent resection and anastomosis, answers the purpose. In any type of operation, it is my custom to make the exploration at the preliminary stage. The exploration should always be carried out in a routine manner in which one examines first the liver, then the aortic nodes, then the nodes in the bifurcation of the iliac vessels, then the bottom of the pelvis and, finally, the growth itself. Gentle manipulation of the

growth, touching it most gingerly and obtaining from this gentle touch some idea as to its mobility and resectability, as well as knowledge of invasion of the local nodes, is highly desirable. The spread of infection not only is brought about by manipulation, but sometimes an unsuspected abscess around the cecum, or an unsuspected abscess of complicated diverticulitis may be opened by the exploring finger when least expected. There is no necessity to repeat the exploration at the second stage of the operation, and consequently less of the peritoneal cavity is exposed to contamination.

In resection of the right half of the colon, I prefer to make the anastomosis end-to-side, over a clamp which I have devised to do this aseptically, and then wait for a period of about four weeks, or even longer occasionally, to do the resection. During this time the local condition almost uniformly is improved by reducing the infection around it, and the patient has not only increased his resistance to the infection, but the whole risk of operation is materially reduced. I emphasize the end-to-side anastomosis, rather than the lateral, because I think it is impossible to divert the fecal stream by the lateral anastomosis, and since this is the most important feature of a graded maneuver, I believe nature's method of end-to-side juncture, as at the ileocecal valve, is much preferable. Although the general rule of performing operations on the right portion of the colon in multiple stages is a good one to which to adhere, there unquestionably is a certain number of cases in which the growth is small, there is no adhesion to the lateral parietal peritoneum and adjacent viscera, and the patient's general condition is such that resection in one-stage is desirable. Perhaps 25 to 30 per cent of cases of carcinoma of the right half of the colon, if diagnosed in their earlier stages, may be treated in this manner, but if one desires to do an operation in a single stage, I think it is imperative in each case that decompression be carried out by enterostomy in which the stoma is made in the terminal part of the ileum. This permits one to relieve gas pressure and tension on the suture line, and assists mater-

ially in healing. The increase in time allowed to elapse between stages in operating on either the right or left half of the colon, in my service, has been a successful innovation. Previous to the last two years, I have been accustomed to perform the second stage of the procedure in two weeks, or three at most, unless the patient constituted a poor risk, and this, I think, frequently was an unhappy practice. The custom of allowing a longer period of time between stages is vulnerable from the standpoint of spread of malignancy, and yet, when one considers that patients with carcinoma of the colon, as they are seen at the clinic, have had symptoms for an average of ten and a half months prior to operation, one can find small room for condemnation of waiting another month or five weeks after the preliminary stage of the operation, if by doing so more patients out of 100 may be submitted to resection. The second stage resection, is a comparatively simple one after ileocolostomy, and consists of mobilization of the right half of the colon by dividing the lateral parietal peritoneum, rotating mesially the whole growth, with its node-bearing tissue and retroperitoneal fat, dividing the bowel above the anastomosis, and peritonizing the raw surfaces encountered. Because, retroperitoneally, there is a pocket and large amount of raw surface which collects serum, it has been my practice to employ drainage in this space, and I have no reason to regret it.

If the growth is situated beyond the hepatic flexure, or more accurately, beyond the middle of the transverse colon, down as far as the juncture of the middle and lower thirds of the sigmoid, it is preferable to remove the invaded segment of bowel at one stage by an obstructive type of resection in every case in which chronic or subacute obstruction may be eliminated by preoperative precautions. This type of procedure, which utilizes all of the satisfactory fundamental principles of the Mikulicz operation and avoids most of its disadvantages, is the most satisfactory in my hands for removal of all mobile segments of the large bowel. By mobilizing the bowel accurately, ligating the blood supply close to the mesentery, and removing all of the nodes

and node-bearing tissues in the immediate vicinity of the growth, it is just as radical a resection as can be carried out by any type of surgical procedure. One may, after removal of the bowel, make sure by visual inspection that the blood supply to its two ends is sufficient. A clamp is left on the two ends of the bowel, and the toilet of the peritoneum is completed, leaving the colon totally obstructed for a period of forty-eight to sixty hours. At the end of this time, the proximal blade of the clamp is released and pressure of gas blows open the end of the colon, decompressing it immediately. The subsequent steps of the operation are completed exactly as in the old Mikulicz procedure. It is a rule that most of these wounds heal spontaneously at the end of two months, if enough spur has been removed between the two stomas, and pouting mucous membrane has not been left attached to the skin.

I would not be misunderstood as totally condemning the Mikulicz operation, for I believe it has an occasional indication, even today, but its indications are so limited and so accurate that as a routine I think it can be almost completely abandoned. Sistrunk, a few years ago, pointed out very accurately the indications for it, and in giving the contraindications, practically eliminated the operation as one of the useful surgical procedures. That is, in cases of adherent growths associated with infection of the wall of the bowel and adjacent tissues; for large growths associated with infection, or obstruction, and for growths in the sigmoid with short mesentery in obese patients with thick abdominal walls, it could not be used. Even casual inspection of this list of contraindications makes it perfectly apparent that there are few situations in which the operation can be employed. I think its most definite indication is in a case somewhat as follows: an elderly, thin, dehydrated, desiccated patient, who is without obstruction, but who is host to a carcinoma of the sigmoid or transverse colon, and who is physically unable to withstand any procedure of moment. On opening the abdomen, under local anesthesia, one finds in the mobile colon a small, scirrhous, encircling growth. The bowel is brought

out on the abdominal wall, and the wound is closed insecurely around it. In such an instance, when further operation would be judged extremely dangerous, such a procedure is desirable. There are a few cases of growths in the left side of the colon, which, because of the type of obstruction present, do not respond to medical decompressive measures, and although there is no evidence of obstruction previously, when the abdomen is opened a thickened and somewhat distended colon is found. In such a situation, I should unquestionably hesitate to advocate any type of resection without preliminary decompression. Such decompression can be carried out either by cecostomy or by colostomy applied above the growth and resection delayed to a more favorable time.

The advantages of cecostomy preliminary to resection of the colon and rectum have been emphasized recently by Whipple in a most illuminating article. He emphasized the work of numerous investigators who have measured the rates of healing of various tissues and called attention to the "lag" period and the first days of fibroplasia of the colon, which are of utmost importance. Up to the fourth day of repair following anastomosis, the cut ends of the bowel are held together by some suture material or mechanical appliance. During this period there is rapid formation of fibrinous exudate, which builds up a barrier to infection until the process of fibroplasia has united the edges of the wound and epithelium has covered the defect. Obviously, during this period, when healing is taking place and apposition at the line of suture is weakest, increased peristaltic action causes distention against the line of suture. The blood supply of the colon which also is scanty, as compared to that of the small bowel and stomach, does not make for rapid healing in the face of infection and, consequently, necrosis at the line of suture, and leakage, occasionally are directly the result of inadequate vascularization. Therefore, as Whipple wrote, the advantages of cecostomy, and one might likewise add colostomy, for the maneuvers accomplish the same thing, are about as follows: (1) It makes possible proper cleansing of the colon

before resection; (2) it permits the part anastomosed to be at rest until the period of fibroplasia is complete; (3) it increases the comfort of the patient by reducing distention and pains of ineffectual peristalsis; (4) it obviates the temptation and the necessity in some cases of giving enemas and irrigations in the critical period of repair; and (5) in cases of partial or complete obstruction of the colon and rectum, it has long been recognized as essential, and if it works so well for patients who are desperately sick, it is even more efficacious in the case without obstruction. Although I prefer colostomy to cecostomy in growths of the left half of the colon, I am heartily in accord with the principles as laid down, and feel that the advantages of decompression are so manifest that there is small question that such a measure is desirable.

One might say of the advantages and disadvantages of technical evolutions applied to the left half of the colon, that rarely, if ever, should primary resection and anastomosis by suture or mechanical appliance be attempted in this arm of the bowel. Occasionally, primary resection and anastomosis will be successful, but usually it is so dangerous and so likely to be followed by untoward complications that I feel its employment at all is distinctly hazardous. Certainly, decompression should follow the primary anastomosis if it is done at all, but for all practical purposes I feel it should almost never be attempted. I believe, undoubtedly, that operations in multiple stages on this half of the colon are infinitely superior to any type of primary anastomosis, infinitely safer, and more surgically correct.

Postoperatively, I have found it highly desirable to adhere to a most systematic and rigid regimen for patients who have been submitted to resection of the colon. In this regimen is incorporated total abstinence from food or liquids by mouth or bowel. Hydration is accomplished by intravenous and subcutaneous introduction of saline and glucose solutions and recently, following the suggestion of Miles, we have come more and more to the use of blood tranfusion after extirpative measures on the large bowel

and rectum. Morphine in adequate amounts to still peristalsis and relieve pain is an anchor to windward after these operations. These and supportive measures over the first five days of convalescence are done as a routine in my service.

Statistics of operability and mortality in surgery of the colon and major surgery of the rectum are inextricably joined. The vague term "operability" has so many shades of meaning to different surgeons that it is only with great difficulty that one arrives at a satisfactory comparison of types of cases which are suitable for resection in the hands of different men. What may be judged removable in the hands of one man is considered inoperable in the hands of another, and yet, the crux of the situation, in arriving at the number of patients cured by surgical methods is that a high standard of operability must be maintained, rather than a low and satisfactory standard of hospital mortality. The usual standards by which one judges operability are: (1) the question as to whether the growth has metastasized to the liver; (2) whether there is lymphatic involvement; (3) whether local fixation to adjacent viscera or the abdominal wall precludes extirpation, and (4) whether the general resistance of the host has declined to such a point that removal is deemed inadvisable from this standpoint. Certainly, small objection will be made in the majority of instances to a surgeon's refusal to resect a colonic carcinoma because of hepatic metastasis. However, one occasionally is justified, I believe, in doing a palliative type of resection in the face of metastasis to the liver, when the growth can be removed with comparatively little danger by some simple technic. This maneuver, although it necessarily can be applied to only a very small group of patients, does give comfort to some, and for that reason is justifiable occasionally. People dying from carcinoma of the liver have a relatively painless and not too uncomfortable demise, whereas if the local lesion is irremovable, it progresses, the ulceration extends, more tissue, adjacent viscera and nerves are involved, and the ultimate outcome is inadequately described by any vocabulary. As to local fixa-

tion and lymphatic involvement, one is not justified, I think, in refusing operation to a patient with carcinoma of the colon because of involvement of the lymphatic structures in immediate juxtaposition to the growth. Likewise, the knowledge that one is unable, by visual examination and by palpation, to tell, in the average case, whether the lymphatic nodes are involved, without removal of one or more for microscopic examination, emphasizes the fact that local lymphatic enlargement is no criterion of operability. To contract the horizon of operability is to improve the hospital mortality but is, I believe, a totally unjustifiable position in dealing with colonic carcinomas which are not amenable to other therapeutic measures than surgery. It is my conviction that borderline cases, or even some cases which are beyond the borderline, should be accepted for resection when there is no evidence of metastasis to the liver, and when the patient is given a chance of recovery, albeit a small one at high operative risk. Certainly, in dealing with intra-abdominal carcinoma, one has no better criterion of operability by which to proceed than to imagine oneself in the place of the patient. Who is there who would not choose a massive resection, even in the face of an obviously high risk?

Fortunately, mortality statistics have been gradually revised downward during the last ten years in this field of surgery, and yet much is still to be desired. I do not believe that one can ever hope to attain the low mortality in dealing with gastro-intestinal carcinoma that one finds in surgical operations for chronic benign ailments. Indeed, I am in complete accord with the view which W. J. Mayo pronounced many years ago; that when his hospital mortality in cases of carcinoma of the colon and rectum descended below 10 per cent, he began to suspect that he was not operating on a great many patients who deserved resection.

During the last three years in The Mayo Clinic, we have, by cooperative management, succeeded in lowering the hospital mortality rate while, at the same time, the curve of operability has been extended. In 1930, the operability was 57.5 per cent; in 1931, it was 56 per cent. The death

rate was reduced to 10.9 per cent in 1930 in a series of 712 operations for organic lesions of the colon and rectum, 68 per cent of which were carcinomatous; the majority of the remainder were either tuberculous or fecal fistulas, and equally as high risk from the standpoint of resection. In 1931, the mortality rate in 719 operations was 9.1 per cent. The same type of lesions predominated here as in the preceding years.

Undeniably, more patients with carcinoma of the large bowel and rectum are appearing at an earlier stage, and yet there is much to be desired in advancing the time of operation. In The Mayo Clinic, the average patient with carcinoma of the large bowel who presents himself for examination has known of symptoms for ten and a half months, striking testimony to an unsuccessful attempt to educate laymen with regard to the obscure symptoms of organic lesions of the gastro-intestinal tract. It is not too much to hope, however, that with increased roentgenologic efficiency in diagnosis of diseases of the colon, with a better understanding of symptoms, and with more coordinated efforts on the part of the medical profession to advance diagnostic methods, that earlier diagnosis will result, and radical extirpation will be followed by more satisfactory end results.

QUALIFICATION FOR FELLOWSHIP IN THE SECTIONS

All of the Sections concerned have expressed approval of the requirements for Fellowship in Sections as agreed upon at the meeting of the Committee on Classification of Fellows with officers of Sections held March 15, 1932.

The proposals will be incorporated into a revision of the By-Laws of the Academy which is about to be undertaken.

The requirements are as follows:

In addition to the requirements for membership in the Academy—

1. Certification by the American Board of Ophthalmology, American Board of Otolaryngology, American Board of Obstetrics and Gynecology, or other national board maintaining equal standards, *or*

2. Award by an approved university of an advanced degree in the specialty together with a period of special practice to make up a total of at least five years work in the specialty, *or*

3. An approved residency or special internship of a minimum of 2 years duration, with a satisfactory amount of basic science work and a period of special practice to make up a total of at least five years work in the specialty, *or*

4. Five years of experience and training in special practice of a character which has met the approval of the section concerned, *or*

5. Qualification by reason of distinguished professional service and standing and at least 10 years in practice, *or*

6. For those not engaged in clinical practice, an equivalent experience and training in a teaching, research or other non-clinical medical field.

FIFTH ANNUAL GRADUATE FORTNIGHT

A Postgraduate Two Weeks Devoted to Neoplastic Diseases

OCTOBER 17 TO 28, 1932

TUMORS

The Program Comprises

HOSPITAL CLINICS, EVENING MEETINGS, AND A SCIENTIFIC EXHIBIT

I. HOSPITAL CLINICS

Afternoon clinical programs will be presented in eighteen of New York's leading hospitals. Among the clinicians who will participate are:

F. E. Adair	J. F. Erdmann	I. Kaplan	W. Martin	B. Samuels
F. M. Allen	L. K. P. Farrar	E. L. Kellogg	F. S. Mathews	H. F. Shattuck
J. B. Amberson	H. Fischer	F. Kennedy	H. W. Meyer	DeW. Stetten
G. C. Andrews	M. Fishberg	J. D. Kernan	W. H. Meyer	A. R. Stevens
F. W. Bancroft	R. T. Frank	M. Keschner	P. W. Nathan	G. D. Stewart
B. S. Barringer	E. D. Friedman	L. Kessel	H. Neuhof	A. Stillman, 2d
A. A. Berg	L. F. Frissell	P. Klemperer	G. G. Ornstein	B. Stookey
J. C. Bloodgood	J. C. A. Gerster	F. H. Lahey	A. T. Osgood	D. Symmers
R. E. Buckley	J. H. Globus	A. Lambert	W. W. Palmer	F. Tilney
H. W. Cave	R. Golden	B. J. Lee	O. Pickhardt	J. J. Valentine
C. G. Coakley	P. S. Goodhart	D. Lewis	A. Plaut	W. W. Weeks
M. Cohen	W. P. Healy	E. Libman	R. E. Pound	H. Wessler
W. B. Coley	C. G. Heyd	H. H. M. Lyle	D. Quick	A. O. Whipple
B. B. Crohn	I. S. Hirsch	J. M. Lynch	H. A. Riley	W. C. White
W. T. Dannreuther	F. C. Holden	G. M. MacKee	G. A. Robinson	F. C. Wood
G. S. Dudley	C. J. Imperatori	W. J. MacNeal	I. Rubin	A. M. Wright
C. A. Elsberg	L. Jaches	D. Marine	F. B. St. John	F. C. Yeomans

II. EVENING SESSIONS

The subjects and speakers at Academy meetings will be:

The history of cancer.....Henry E. Sigerist
Cancer research.....Francis Carter Wood
The factors constituting malignancy and tumors.....James Ewing
The consecutive clinical and pathological events in cancer
Harrison S. Martland
The importance of statistics in cancer control.....Louis I. Dublin
Tumors of the brain.....Charles A. Elsberg
Tumors of optic chiasm and optic tract .....Harvey Cushing

Tumors of the eye and orbit.....W. Gordon M. Byers
Cholesteatoma .....Samuel J. Kopetzky
Tumors of the spinal cord.....Byron Stookey
Tumors of the nerves.....Dean Lewis
Tumors of the pleura and lungs .....George J. Heuer, James Alex. Miller
Tumors of the bladder.....Edwin Beer
Malignancies of the prostate.....Joseph F. McCarthy
Cancer of the uterus.....George Gray Ward
Fibroids and adenomata.....Thomas S. Cullen
Tumors complicating pregnancy.....Benjamin P. Watson
Cancer of the stomach.....Donald C. Balfour
Tumors of the colon and rectum.....Daniel F. Jones
Tumors of the mouth and tongue.....Carl Eggers
Tumors of bones and allied structures ...James M. Hitzrot, R. E. Herendeen
Tumors of the skin and mucous membranes .....A. Benson Cannon
Hodgkin's disease and lymphadenomata.....Lloyd F. Craver

III. SCIENTIFIC EXHIBIT

Concurrent with the Fortnight, and for an added week thereafter, there will be housed in the Academy building an exhibition numbering approximately 3000 units. A number of the sections in the exhibition will be subjected to lecture demonstrations at regular intervals.

No fees will be charged for attendance at any of the clinics or meetings on the program.

A COMPLETE PROGRAM AND REGISTRATION BLANK FOR CLINICS AND DEMONSTRATIONS WILL BE MAILED ON REQUEST

DIRECTORY OF QUALIFIED OCCUPATIONAL THERAPISTS

The American Occupational Therapy Association has just issued its first Annual Directory of Qualified Occupational Therapists. Copies of the new directory may be obtained from the Association, 175 Fifth Avenue, New York City.

RECENT ACCESSIONS TO THE LIBRARY

Ahlswede, E. H., Practical treatment of skin diseases.
N. Y., Hoeber, 1932, 770 p.

Andrews, C. L., How's your blood pressure?
N. Y., Macmillan, 1931, 225 p.

Beyer, H. and Seiffert, A. Der Operationskurs des Hals-, Nasen- und Ohrenarztes.
Leipzig, Kabitzsch, 1932, v. 1.

Bland, P. B. Gynecology, medical and surgical. 2. ed.
Phil., Davis, 1932, 1249 p.

Bostock, J. The neural energy constant.
London, Allen, [1931], 181 p.

Braun, L. Herz und Angst; eine ärztlich-psychologische Studie.
Wien, Deuticke, 1932, 119 p.

Bruhns, C. and Alexander, A. Grundriss der mykologischen Diagnostik.
Berlin, Springer, 1932, 206 p.

Caudwell, I. Damien of Molokai, 1840-1889.
N. Y., Macmillan, 1932, 203 p.

Clark, A. J. Applied pharmacology. 4. ed.
London, Churchill, 1932, 590 p.

Coates, V. M. and Delicati, L. Rheumatoid arthritis and its treatment.
London, Lewis, 1931, 114 p.

Colin, H. Les diastases.
Paris, Doin, 1931, v. 1.

Compton, P. The genius of Louis Pasteur.
N. Y., Macmillan, 1932, 361 p.

Cushing, H. W. Intracranial tumours.
Springfield, Ill., Thomas, 1932, 150 p.

Cutting, R. A. Principles of preoperative & postoperative treatment.
N. Y., Hoeber, 1932, 812 p.

Danis, R. Technique de l'ostéosynthèse.
Paris, Masson, 1932, 160 p.

Delmege, J. A. Towards national health; or, health and hygiene in England from Roman to Victorian times.
London, Heinemann, 1931, 234 p.

Desaux, A. and Boutelier, A. Manuel pratique de dermatologie.
Paris, Masson, 1932, 2 v.

Dible, J. H. Recent advances in bacteriology and the study of the infections. 2. ed.
London, Churchill, 1932, 476 p.

Ellis, D. Sulphur bacteria.
London, Longmans, 1932, 261 p.

Felcher, F. R. The art of porcelain in dentistry.
St. Louis, Mosby, 1932, 360 p.

Fishberg, M. Pulmonary tuberculosis. 4. ed.
Phil., Lea, 1932, 2 v.

Fontes, A. L'ultravirus tuberculeux.
Paris, Masson, 1932, 108 p.

Fortune, R. F. Sorcerers of Dobu; the social anthropology of the Dobu Islanders.
London, Routledge, 1932, 318 p.

Geschickter, C. F. and Copeland, M. M. Tumors of bone.
N. Y., Amer. Jour. of Cancer, 1931, 709 p.

Gifford, S. R. A hand-book of ocular therapeutics.
Phil., Lea, 1932, 272 p.

Goodrich, A. W. The social and ethical significance of nursing.
N. Y., Macmillan, 1932, 401 p.

Gould, A. G. and Dye, J. A. Exercise and its physiology.
N. Y., Barnes, 1932, 434 p.

Graves, L. G. Food in health and disease.
N. Y., Macmillan, 1932, 390 p.

Hays, H. M. The modern conception of deafness.
St. Louis, Laryngoscope, 1932, 149 p.

Joll, C. A. Diseases of the thyroid gland, with special reference to thyrotoxicosis.
London, Heinemann, 1932, 682 p.

Karsner, H. T. Human pathology. 3. ed.
Phil., Lippincott, [1931], 1012 p.

Klemperer, G. Fünfzig Jahre Kongress für innere Medizin, 1882-1932.
München, Bergmann, 1932, 164 p.

Kline, B. S. Microscopic slide precipitation tests for the diagnosis and exclusion of syphilis.
Balt., Williams, 1932, 99 p.

Kowarski, A. Klinische Mikroskopie.
Berlin, Urban, 1932, 172 p.

Labbé, E. M.; Labbé, H. and Nepveux, F. Techniques de laboratoire appliquées aux maladies de la digestion et de la nutrition.
Paris, Masson, 1932, 886 p.

Laubenheimer, K. Lehrbuch der Mikrophotographie und Mikroprojektion. 2. Aufl.
Berlin, Urban, 1931, 272 p.

Lehrbuch der Mund- und Rachenkrankheiten. Hrsg. von Josef Berberich.
Leipzig, Thieme, 1932, 587 p.

Leuck, M. S. A study of dental clinics in the United States: 1930
Chic., Univ. of Chic. Pr., [1932], 107 p.

Leven, M. The practice of dentistry and the incomes of dentists in twenty states: 1929.
Chic., Univ. of Chic. Pr. [1932], 224 p.

Liepmann, W. and Danelius, G. Geburtshelfer und Röntgenbild.
Berlin, Urban, 1932, 271 p.

Malattie da virus filtrabili e sconosciuti, a cura dei Giuseppe Brotzu [et al.]
Torino, Unione Tipografico-Editrice Torinese, 1932, 416 p.

Manual (A) for dental assistants, edited by A. E. Webster.
Phil., Lea, 1932, 356 p.

Marshall, C. J. The surgeon.
[London], Bles, [1932], 192 p.

Muffit, T. S. Biological foundations in education.
Phi.., Blakiston, [1931], 394 p.

National conference on nomenclature of disease. A standard classified nomenclature of disease. Preliminary printing.
N. Y., Commonwealth Fund, 1932, 653 p.

Newsholme, (Sir) A. Medicine and the state.
London, Allen, [1932], 300 p.

Nott, H. W. The thyroid and manganese treatment; its history, progress and possibilities.
London, Heinemann, 1931, 265 p.

Parry, L. A. Criminal abortion.
London, Bale, 1932, 203 p.

Rahn, O. Physiology of bacteria.
Phil., Blakiston, [1932], 438 p.

Rasmussen, A. T. The principal nervous pathways.
N. Y., Macmillan, 1932, 73 p.

Richards, E. L. Behaviour aspects of child conduct.
N. Y., Macmillan, 1932, 299 p.

Roessle, R. and Roulet, F. Mass und Zahl in der Pathologie.
Berlin, Springer, 1932, 144 p.

Sanarelli, G. Il colera; epidemiologia, patologia, batteriologia, terapia e profilassi.
Milano, Soc. An. Istituto Editoriale Scientifico, 1931, 559 p.

Singer, K. Diseases of the musical profession.
N. Y., Greenberg, [1932], 253 p.

Sluss, J. W. and Martin, J. W. Emergency surgery. 5. ed.
Phil., Blakiston, [1931], 879 p.

Smith, S. A. and Glaister, J., jr. Recent advances in forensic medicine.
London, Churchill, 1931, 194 p.

Sneed, W. L. Orthopedics in childhood.
Phil., Lippincott, [1931], 318 p.

Sollman, T. H. A manual of pharmacology. 4. ed.
Phil., Saunders, 1932, 1237 p.

Stone, E. P. Medicine among the American Indians.
N. Y., Hoeber, 1932, 139 p.

Storer, H. R. Medicina in nummis; a descriptive list of the coins, medals, jetons, relating to medicine, surgery, and the allied sciences.
[Boston, Wright, 1931], 1146 p.

Stout, A. P. Human cancer.
Phil., Lea, 1932, 1007 p.

Strachstein, A. The penalty. Must we pay it?
N. Y., Blanchard, [1931], 136 p.

Thorek, M. Surgical errors and safeguards.
Phil., Lippincott, [1932], 696 p.

Vaughan, G. T. Papers on surgery and other subjects.
Wash., Roberts, 1932, 408 p.

Weber, R. Pathologie und Therapie der entzündlichen Erkrankungen des Zahnmarks.
Stuttgart, Enke, 1932, 149 p.

Wheeler, R. H. The laws of human nature.
London, Nisbet, [1931], 232 p.

White House Conference on Child Health and Protection. Section I. Medical Service. Committee A. Growth and Development. Growth and development of the child. Part III. Nutrition.
N. Y., Century, [1932], 532 p.

White House Conference on Child Health and Protection. Section I. Medical Service. Committee B. Prenatal and Maternal Care. Subcommittee on Obstetric Teaching and Education. Obstetric education. Report.
N. Y., Century, [1932], 302 p.

White House Conference on Child Health and Protection. Section I. Medical Service. Committee C. Medical Care for Children. Subcommittee on Medical Education. Pediatrics: education and practice. Report.
N. Y., Century, [1931], 117 p.

White House Conference on Child Health and Protection. Section I. Medical Service. Committee C. Medical Care for Children. Subcommittee on Nutrition. Nutrition service in the field. Report.
N. Y., Century, [1932], 139 p.

White House Conference on Child Health and Protection. Section I. Medical Service. Committee C. Medical Care for Children. Subcommittee on Orthopedics and Body Mechanics. Body mechanics; education and practice. Report.
N. Y., Century, [1932], 166 p.

White House Conference on Child Health and Protection. Section I. Medical Service. Committee C. Medical Care for Children. Subcommittee on Psychology and Psychiatry. Psychology and psychiatry in pediatrics; the problem. Report.
N. Y., Century, [1932], 146 p.

White House Conference on Child Health and Protection. Section III. Education and Training. Committee C. The School Child. The school health program. Report.
N. Y., Century, [1932], 400 p.

White House Conference on Child Health and Protection. Section III. Education and Training. Committee D. Vocational Guidance and Child Labor. Subcommittee on Child Labor. Child labor. Report.
N. Y., Century, [1932], 592 p.

Williams, E. H. The insanity plea.
Balt., Williams, 1931, 169 p.

Williams, J. F. and Morrison, W. R. A text-book of physical education.
Phil., Saunders, 1931, 343 p.

Wustrow, P. Klinik der zahnärztlichen Orthopädie.
Leipzig, Thieme, 1932, v. 1, pt. 1.

Yellowlees, H. Clinical lectures on psychological medicine.
London, Churchill, 1932, 310 p.

Zuckerman, S. The social life of monkeys and apes.
London, Paul, 1932, 357 p.

PROCEEDINGS OF ACADEMY MEETINGS

MAY, 1932

STATED MEETINGS

Thursday Evening, May 5, at 8:30 o'clock

I. EXECUTIVE SESSION
Reading of the Minutes.
Election of Fellows by Ballot.
Presentation of Diplomas.

II. THE SEVENTH HERMANN MICHAEL BIGGS MEMORIAL LECTURE:
Robert Koch and His Life Work, Lawrason Brown, Trudeau Sanitarium, Saranac Lake, N. Y.

Thursday Evening, May 19, at 8:30 o'clock

THE EIGHTH HARVEY LECTURE

"Histochemistry: Present State and Future," A. Policard, Lyons, France.

This lecture takes the place of the second Stated Meeting of the Academy for May.

SECTION MEETINGS

SECTION OF DERMATOLOGY AND SYPHILOLOGY

Tuesday Evening, May 3, at 8:30 o'clock

I. EXECUTIVE SESSION
a. Reading of the Minutes.
b. Election of Officers:
For Chairman—A. Benson Cannon.
For Secretary—Louis Chargin.
For member of Advisory Committee—Howard Fox.

II. PRESENTATION OF CASES
a. Cases from the Beth Israel Hospital.
b. Cases from the Sea View Hospital.
c. Miscellaneous cases.

III. GENERAL DISCUSSION

Joint Meeting of the
SECTION OF NEUROLOGY AND PSYCHIATRY
and the
NEW YORK NEUROLOGICAL SOCIETY

Tuesday Evening, May 3, at 8:30 o'clock

I. EXECUTIVE SESSION
a. Reading of the Minutes.
b. Election of Officers of Section of Neurology and Psychiatry:
For Chairman—Byron Stookey.
For Secretary—Clarence Oberndorf.
For member of Advisory Committee—Joseph H. Globus.

II. Papers of the Evening
   a. Pneumorachioclysis and cervico-lumbar irrigation in the treatment of meningococcic meningitis, Leon H. Cornwall.
   b. On tactile imagination and tactile after-effects, Walter Bromberg (by invitation), Paul F. Schilder.
   c. Surgical treatment of brain abscess, Francis C. Grant, University Hospital, Philadelphia (by invitation).
   d. Head injury—its neurologic and psychiatric aspect, Israel Strauss, Nathan Savitsky (by invitation).

III. Discussion, Foster Kennedy, J. J. Moorhead, V. A. Zimmer (by invitation), Charles A. Elsberg, Paul F. Schilder, Joseph E. J. King, Raphael Lewy.

Section of Surgery

Friday Evening, May 6, at 8:30 o'clock

I. Executive Session
   a. Reading of the Minutes.
   b. Election of Officers:
      For Chairman—William Barclay Parsons, Jr.
      For Secretary—William F. Cunningham.
      For member of Advisory Committee—Robert H. Kennedy.

II. Presentation of Instrument and Cases
   a. Clamp tourniquet, Harry Cohen.
   b. Sub-sternal thyroid adenoma with varicosities of the chest wall, Carnes Weeks.
   c. Mesenteric cysts with torsion of the mesentery, Philip J. Lipsett.
   d. Stab wound of the heart, Edwin G. Ramsdell.
   e. Three cases illustrating the first paper of the evening, Edward W. Peterson.
   f. Two cases illustrating the second paper of the evening, Joseph B. Stenbuck (by invitation).

III. Papers of the Evening
   a. Mesenteric and omental cysts, Edward W. Peterson.
   b. Penetrating stab wounds of the chest. A study of 67 cases operated upon since June 1, 1931, John F. Connors, Joseph B. Stenbuck (by invitation).

IV. General Discussion.

Section of Historical and Cultural Medicine

Wednesday Evening, May 11, at 8:30 o'clock

I. Executive Session
   a. Reading of the Minutes.
   b. Election of Officers:
      For Chairman—C. N. B. Camac.
      For Secretary—Howard Reid Craig.
      For member of Advisory Committee—Louis F. Bishop.

II. Papers of the Evening

a. Scurvy: "The Plague of the Sea and the Spoyle of Mariners," Karl Vogel.

b. The illustrated initial letters of the anatomic treatise of Vesalius (lantern slides), Samuel W. Lambert.

III. General Discussion

Section of Pediatrics

Thursday Evening, May 12, at 8:00 o'clock

I. Executive Session

a. Reading of the Minutes.

b. Election of officers:

For Chairman—John Caffey.

For Secretary—Harry Bakwin.

For member of Advisory Committee—Herbert B. Wilcox.

II. Single Case Presentation Was Given by the Following Hospitals:

Babies' Hospital, Chondrodystrophia dwarfism, hereditary ectodermal dysplasia, supernumerary fingers and esotropia, A. A. Weech (by invitation).

Bellevue Hospital, Late rickets, Richard Schoor (by invitation).

Fifth Avenue Hospital, Epileptiform seizures in patient with brain tumor and improved with ketogenic diet, John Metcalfe (by invitation).

Mt. Sinai Hospital, Leishmaniasis infantum, George J. Ginandes (by invitation).

Nursery and Child's Hospital, Case of myeloid leukemia with an initial leukopenic stage of seven months duration and erythrophagocytosis, Carl H. Smith (by invitation).

Post Graduate Hospital, Experimental treatment of inherited haemophilia, Marshall C. Pease.

Roosevelt Hospital, Osteitis fibrosa cystica with changes after partial parathyroidectomy, John F. Landon.

St. Luke's Hospital, Hemolytic jaundice, Harold W. Dargeon (by invitation).

St. Mary's Hospital, Meningococcus septicemia followed by meningococcus meningitis, Elizabeth Knox (by invitation).

St. Vincent's Hospital, Massive collapse of lungs following appendectomy, George B. Bader (by invitation).

Willard Parker Hospital, Pathological report, Lawrence W. Smith.

Section of Ophthalmology

Monday Evening, May 16, at 8:30 o'clock

I. Executive Session

a. Reading of the Minutes.

b. Election of officers:

For Chairman—Mark J. Schoenberg.

For Secretary—Algernon B. Reese.

For member of Advisory Committee—Herbert W. Wootton.

II. Scientific Meeting in Collaboration with the Staff of the Brooklyn Eye and Ear Infirmary
   a. Grattage trachoma, P. Chalmers Jameson (by invitation).
   b. Progressive refraction changes following a trephine operation, James W. Smith.
   c. A new type of hand ophthalmoscope and accessories, John N. Evans.
   d. The effect of drugs on the cerebral circulation, Hubert S. Howe.
   e. Pathology and pathogenesis of sympathetic ophthalmia, J. Arnold DeVeer (by invitation).
   f. The first American journal and its editor, Ralph I. Lloyd.
   g. Essential hypertension. Observations on rabbits and man. Fundus studies, S. A. Agatston.

III. Demonstration Before the Meeting
   a. Slit lamp cases, M. L. Berliner, G. Bonaccolta (by invitation), I. Goldstein, W. L. Hughes, Benjamin Friedman (by invitation).
   b. Old ophthalmoscopes, William F. C. Steinbugler.
   c. Exhibition of a spot light object for perimetry, John N. Evans.

Section of Medicine

Tuesday Evening, May 17, at 8:30 o'clock

I. Executive Session
   a. Reading of the Minutes.
   b. Election of Officers:
      For Chairman—Robert F. Loeb.
      For Secretary—Henry J. Spencer.
      For member of Advisory Committee—Mills Sturtevant.

II. Papers of the Evening
   a. Incidence of rheumatic fever, John Staige Davis.
   b. Recent advances in knowledge of the function of the pituitary, Walter Timme.
   c. Recent advances in knowledge of the function of the ovary, Raphael Kurzrok.
   d. Discussion, Homer F. Swift, Irving H. Pardee, Earl T. Engle, Ph.D. (by invitation).

Section of Genito-urinary Surgery

Wednesday Evening, May 18, at 8:30 o'clock

1. Executive Session
   a. Reading of the Minutes.
   b. Election of Officers:
      For Chairman—George F. Hoch.
      For Secretary—C. Travers Stepita.
      For member of Advisory Committee—Thomas J. Kirwin.

II. Presentation of Cases
   a. A case of colon bacilluria with multiple calculi of the prostate

(operation with anatomical cure). Intestinal antisepsis with physiological cure, Victor C. Pedersen.

b. Traumatic anuria, Francis O. Harbach (by invitation).
Discussion, Anthony Bassler, Oswald S. Lowsley.

c. Inoperable cancers of the prostate, bladder and testes treated with irradiation, Archie L. Dean, Jr.

III. Papers of the Evening

a. Cysts of the prostate, Benjamin S. Barringer.

b. Observations based on a series of 150 bladder cancers, George Gilbert Smith, Boston (by invitation).

IV. General Discussion

Section of Otolaryngology

Wednesday Evening, May 18, at 8:30 o'clock

I. Executive Session

a. Reading of the Minutes.

b. Election of Officers:
For Chairman—Charles J. Imperatori.
For Secretary—David H. Jones.
For members of Advisory Committee—Thomas J. Harris, for 5 years, Francis White, for 4 years, to fill the unexpired term of David H. Jones (resigned).

II. Presentation of Instrument

Scissor hemostat, Arthur F. Warren (by invitation).

III. Presentation of Patients

a. Radium in malignant tumors of the nasal sinuses, G. Allen Robinson.

b. Correction of post auricular defect by implantation of fascia lata, Charles M. Griffith (by invitation).

c. Laryngectomized patient—operation 14 years ago, John McCoy.

IV. Presentation of Case Reports

a. Nasopharyngeal malignancy—report to 3 cases, E. H. Moyle (by invitation).

b. Otitic infections with gastroenteritis in infants, Max Rabbiner (by invitation).
(a and b were presented as a summary. Publication in full will be in the Transactions of the Section in the "Laryngoscope.")

V. Papers of the Evening

a. The problems of the styloid process, Robert H. Fowler.

b. The use of Avertin in esophagoscopy, George R. Brighton.

c. My experiences with anesthesia for laryngectomy, William Branower (by invitation).

d. Tonsillectomy in the presence of thyroid disease, H. G. Bullwinkel.

e. Treatment of labyrinthitis, Daniel Cunning (by invitation).

f. The technic of some of the uses of surgical diathermy in rhinolaryngology, W. W. Morrison.

g. Intranasal opening of the maxillary antrum by electro-surgery and coagulation, Louis Hubert.

h. The value of dry treatment in acute infections of the middle ear and mastoid, Hugh Blackwell.

Section of Orthopedic Surgery

Friday Evening, May 20, at 8:30 o'clock

I. Executive Session

a. Reading of the Minutes.

b. Election of Officers:

For Chairman—Mather Cleveland.

For Secretary—Paul C. Colonna.

For member of Advisory Committee—Isadore Zadek.

II. Presentation of Cases

a. Treatment of plantar warts by electrocoagulation. Clinical demonstration, K. G. Hansson.

b. Posterior bone block for paralytic equinus deformity. Demonstration of cases, Francis Carr (by invitation).

c. 1. Two cases of osteomyelitis of the cervical vertebrae

2. Compound fracture of an epiphysis of the finger with replacement. Seth Selig.

III. Paper of the Evening

Pathological changes and the clinical significance of intervertebral disc extension into the bodies of the vertebrae, David Sashin (by invitation).

IV. General Discussion

Section of Obstetrics and Gynecology

Tuesday Evening, May 24, at 8:30 o'clock

I. Executive Session

a. Reading of the Minutes.

b. Election of Officers:

For Chairman—Francis W. Sovak.

For Secretary—Frederick C. Freed.

For member of Advisory Committee—Gerard L. Moench.

II. Papers of the Evening

a. The slowing of the foetal heart and its relation to foetal placental circulation, Morris Leff.

Discussion, William E. Caldwell, George B. Wallace, Samuel J. Scadron.

b. Pregnancy and labor subsequent to abruptio placenta, Samuel S. Rosenfeld.

Discussion, Abraham J. Rongy.

c. "Genital" anatomical averages obtained from superimposed tracings, Robert L. Dickinson.

d. Roentgen pelvimetry—the Grid method and a modification, Herbert Thoms, New Haven.

Discussion, Leon T. Le Wald, Gerard L. Moench, Robert L. Dickinson.

Affiliated Societies

New York Roentgen Society
In affiliation with
The New York Academy of Medicine
Monday Evening, May 16, at 8:30 o'clock

I. 8:30 to 9:00 o'clock
Demonstration of interesting cases and roentgenograms.

II. 9:00 o'clock
a. Observations on malignant metastatic invasion of the lungs through the lymphatics, Paul C. Swenson.
b. A discussion of bone regeneration, Clay Ray Murray.
c. Observations on the differentiation of malignant and non-malignant lesions of the large intestine, Ross Golden.

III. General Discussion

IV. Executive Session

New York Meeting of the
Society for Experimental Biology and Medicine
Under the auspices of
The New York Academy of Medicine
Wednesday, May 18, at 8:15 o'clock

I. Bacterial Structure with Particular Reference to the Capsule, J. W. Churchman and N. V. Emelianoff (demonstrations will be available before the meeting).

II. Precipitin Formation in *S. viridans* Subacute Endocarditis, D. Seegal, M. Heidelberger, and E. L. Jost.

III. A Laboratory Method for the Diagnosis of Psittacosis in Man, T. M. Rivers and G. P. Berry.

IV. Normal and Pathological Permeability of the Lymphatic Capillaries in Human Skin, S. S. Hudack and P. D. McMaster.

V. Excretion of Lactic Acid in Sweat, E. H. Fishberg.

VI. Biological Assay of Pregnandiol, R. T. Frank and H. Sobotka.

VII. Protective Action of Copper and Iron Against *Bartonella muris* Anemia, J. Marmorston-Gottesman and D. Perla.

VIII. Effect of Ca, K, and C_H on the Response of the Intestine to Drugs, W. Salant and W. M. Parkins.

IX. Role of the NH_2, OH and -As=As-Groups in Parasitotoxic Action of Arsphenamine Derivatives, L. Reiner and C. S. Leonard.

New York Pathological Society

In affiliation with

The New York Academy of Medicine

Thursday Evening, May 26, at 8:30 o'clock

I. Demonstration of Pathological Specimens

II. Papers of the Evening

a. The pathology of hemolytic jaundice, William P. Thompson (by invitation).

b. Unusual metastases of malignant tumors; report of six cases, Angela M. Sala.

c. Factors influencing types of bone resorption, Henry L. Jaffe (by invitation), A. Bodansky.

d. A case of acute myeloid leukemia with unusual features, Edith E. Sproul (by invitation).

III. Executive Session

DEATHS OF FELLOWS OF THE ACADEMY

Anne Tefft Bingham, 1 Madison Avenue, New York City; graduated in medicine from Syracuse University, Syracuse, N. Y., in 1900; elected a Fellow of the Academy January 15, 1920; died, May 20, 1932. Dr. Bingham was a Fellow of the American Medical Association, a member of the County and State Medical Societies, a member of the American Psychiatric Society and the Clinical Psychiatric Society. Dr. Bingham had been a member of the medical staff of the Metropolitan Life Insurance Company for nine years.

Arthur Hutchins Cilley, M.D., 120 East 34 Street, New York City; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1896; elected a Fellow of the Academy January 3, 1901; died, May 31, 1932. Dr. Cilley was a Fellow of the American Medical Association, a Fellow of the American College of Surgeons, a member of the County and State Medical Societies, a member of the American Orthopedic Society, a member of the Society of Alumni of the Post-Graduate Medical School and Hospital, also of the Hospital for Ruptured and Crippled. He was Chief Orthopedist to Cornell Clinic and Consulting Orthopedic Surgeon to Reconstruction Hospital Unit of the Post-Graduate Hospital and Riverside Hospital.

George Foster Comstock, M.D., Saratoga Springs, N. Y.; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1883; elected a Fellow of the Academy March 4, 1897; died, June 1, 1932. Dr. Comstock was a Fellow of the American Medical Association, a Fellow of the American College of Surgeons, a member of the County and State Medical Societies, and Surgeon to The Saratoga Hospital.

William Williams Keen, M.D., Philadelphia, Pa.; graduated from Jefferson Medical College, Philadelphia, in 1862; elected an Honorary Fellow of the Academy February 4, 1904; died, June 7, 1932. Dr. Keen was the first American to be elected President of the International Congress of Surgery; he had been President of the American Surgical Association, the American Medical Association, the College of Physicians of Philadelphia; the Congress of American Physicians and Surgeons, and the American Philosophical Society. At the time of his death, Dr. Keen was 95 years old.

John Leshure, M.D., 924 West End Avenue, New York City; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1898; elected a Fellow of the Academy, March 6, 1902; died, June 10, 1932. Dr. Leshure was a Fellow of the American Medical Association, a member of the County and State Medical Societies, and Director of the Laryngological and Otological Department of the Lutheran Hospital.

WILLIAM BROADDUS PRITCHARD, M.D., Princess Anne, Maryland; graduated from the College of Physicians and Surgeons, Baltimore, in 1885; elected a Fellow of the Academy October 5, 1893; died, June 6, 1932. Dr. Pritchard was formerly Professor of nervous and mental diseases to New York Medical School and Hospital, he also had been Consulting Neurologist to City Hospital here, and the New York Neurological Hospital, and Consulting Neurologist to Knickerbocker Hospital, Staten Island Hospital and St. Vincent's Hospital, Staten Island.

IRA OTIS TRACY, M.D., 181 Hancock Street, Brooklyn, N. Y.; graduated in medicine from the College of Physicians and Surgeons, New York City, in 1882; elected a Fellow of the Academy May 15, 1902; died, June 4, 1932. Dr. Tracy was a Fellow of the American Medical Association, and a member of the County and State Medical Societies.

OFFICERS OF SECTIONS AND AFFILIATED SOCIETIES, 1932-33

Dermatology and Syphilology, 1st Tuesday

Chairman	*Secretary*
A. Benson Cannon	Louis Chargin
371 Park Avenue	1 West 85 Street

Surgery, 1st Friday

William Barclay Parsons, Jr.	William F. Cunningham
180 Ft. Washington Avenue	654 Madison Avenue

Neurology and Psychiatry, 2nd Tuesday

Byron Stookey	Clarence P. Oberndorf
151 East 83 Street	112 West 59 Street

Historical and Cultural Medicine

2nd Wednesday of November, January, March and May

C. N. B. Camac	Howard Reid Craig
76 East 56 Street	175 East 79 Street

Pediatrics, 2nd Thursday

John Caffey	Harry Bakwin
Bard Hall, Haven Avenue	132 East 71 Street

Ophthalmology, 3rd Monday

Mark J. Schoenberg	Algernon B. Reese
1160 Park Avenue	73 East 71 Street

Medicine, 3rd Tuesday

Robert F. Loeb	Henry J. Spencer
Presbyterian Hospital	24 West 10 Street

Genito-Urinary Surgery, 3rd Wednesday

George F. Hoch	C. Travers Stepita
115 East 61 Street	2 East 54 Street

Otolaryngology, 3rd Wednesday

Charles J. Imperatori	David H. Jones
108 East 38 Street	140 East 54 Street

Orthopedic Surgery, 3rd Friday

Mather Cleveland	Paul C. Colonna
115 East 61 Street	59 East 54 Street

Obstetrics and Gynecology, 4th Tuesday

Francis W. Sovak	Frederick C. Freed
117 East 72 Street	59 East 54 Street

The New York Roentgen Society, 3rd Monday

President	*Secretary*
Robert E. Pound	J. Bennett Edwards
1249 Fifth Avenue	144 Woodridge Pl., Leonia, N. J.

Society for Experimental Biology and Medicine, 3rd Wednesday

Dayton J. Edwards	A. J. Goldforb
First Avenue and 28 Street	Convent Avenue and 139 Street

Harvey Society, 3rd Thursday

Alfred F. Hess	Edgar Stillman
16 West 86 Street	22 East 69 Street

New York Pathological Society, 4th Thursday

Paul Klemperer	Maurice N. Richter
378 Central Park West	630 West 168 Street